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MONITORING STUDY

Fourth Annual Report

for the period

September 1, 1982 - September 1, 1983

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December 1983

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TABLE OF CONTENTS

LIST OF FIGURES.....	iv
LIST OF TABLES.....	v
LIST OF APPENDICES.....	vi
INTRODUCTION.....	1
METHODS.....	2
Species List Update.....	3
Project Area Wildlife Census.....	4
Bald Eagle Survey.....	4
Harlequin Duck Special Studies.....	5
Bighorn Sheep Studies.....	5
Amphibian and Reptile Search.....	6
WEATHER.....	6
RESULTS AND DISCUSSION.....	7
Species List Update.....	7
Project Area Wildlife Census.....	19
Bald Eagle Survey.....	27
Harlequin Duck Special Studies.....	28
Bighorn Sheep Studies.....	29
Amphibian and Reptile Search.....	33
ERRATUM.....	34
LITERATURE CITED.....	35
APPENDICES.....	36

LIST OF FIGURES

Figure 1. Seasonal variation in total numbers of species encountered during project area censuses.....	22
Figure 2. Seasonal variation in average numbers of species encountered during area censuses.....	23
Figure 3. Seasonal variation in average numbers of dippers encountered during project area wildlife censuses.....	24
Figure 4. Seasonal variation in average number of Canada goose, mallard, common goldeneye, and common merganser encountered during project area wildlife censuses.....	25
Figure 5. Seasonal variation in duck use of the project area.....	26
Figure 6. Observations of bighorn sheep during roadside surveys, September 1982-September 1983.....	30
Figure 7. Seasonal variation in average number of bighorn sheep observed during roadside surveys.....	32

LIST OF TABLES

Table 1.	Schedule of September 1982-September 1983 field work, Kootenai Falls wildlife monitoring study.....	3
Table 2.	Summary of weather parameters at Libby, September 1982-July 1983.....	7
Table 3.	Summary of data collected on amphibian, reptile, and bird species observed on the Kootenai Falls study area, January 1978-August 1983.....	8
Table 4.	Summary of data collected on mammals observed on the Kootenai Falls study area, January 1978-August 1983.....	16
Table 5.	Results of project area wildlife censuses, September 1982-August 1983.....	19
Table 6.	Bald eagle observations made during the monitoring study in the Kootenai Falls area, September 1982-September 1983.....	27
Table 7.	Herlequin duck observations in the Kootenai Falls area, September 1982-August 1983.....	28
Table 8.	Results of bighorn sheep roadside surveys, Kootenai Falls study area, 1983.....	33

LIST OF APPENDICES

A. Habitat Categories.....	36
B. Codes Used for Recording Wildlife Observations.....	37

INTRODUCTION

Northern Lights, Inc. (NLI), a rural electric cooperative based in Sandpoint, Idaho, submitted an application to the Montana Department of Natural Resources and Conservation (DNRC) in 1980 to build a hydroelectric dam and generating plant, known as the Kootenai River Hydroelectric Project, in the Kootenai Falls area of Lincoln County, Montana. In 1978, NLI contracted with DNRC to conduct a baseline wildlife investigation in the project area. The results of that study, completed in September 1979, were published later that year (DNRC 1979).

To keep the wildlife data base current and to determine the nature of year-to-year variations in wildlife use of the project area, NLI contracted with DNRC in October 1979 to monitor wildlife in the study area (see DNRC 1979 for a study plan). This study was designed to provide a data base for documenting project-related impacts and for determining the success of mitigation and compensation programs, should the Board of Natural Resources and Conservation issue a certificate for the project at the Kootenai Falls site.

The first annual report (DNRC 1981a) documented results from the first year of the Kootenai Falls wildlife monitoring study (September 2, 1979, through September 1, 1980). The area monitored in that study was the same as the area inventoried during the original baseline study (DNRC 1979, pp. 2-3), although some surveys also were conducted along U.S. Highway 2 between Libby and Troy.

The second annual report (DNRC 1981b) highlighted results from the second year of the Kootenai Falls wildlife monitoring study (September 1, 1980, through August 31, 1981). The area investigated during that monitoring period was basically the same as studied during the first monitoring period. Some modifications in monitoring study design, as suggested in the first annual report (DNRC 1981a), were employed in the second year of monitoring.

The third annual report (DNRC 1982) presented the results from the third year of the wildlife monitoring study (September 1, 1981, through August 31, 1982). The study area was the same as in the past two years of monitoring with some modifications in study design, as suggested in the second annual report.

This study presents the results of the fourth year of the wildlife monitoring study (September 1, 1982, through September 1, 1983).

METHODS

Field techniques and analytical methods used in this study were as described in the baseline studies report (DNRC 1979, pp. 109-112) and the first annual report (DNRC 1981a). A brief summary of methods employed for individual study segments follows (see also table 1).

Table 1. Schedule of September 1982 - September 1983 field work,
Kootenai Falls wildlife monitoring study.

Dates	Observer ¹	Type of Field Work
December 30, 1983- January 3, 1983	PN	Project census, bald eagle survey, bighorn sheep counts.
April 11-14, 1983	PN, LT	Riparian wildlife census, bighorn sheep count, am- phibian and reptile seearch
May 27-30, 1983	SK	Project area census, harlequin duck survey, big- horn sheep count, amphibian and reptile search.
July 29-August 1, 1983	SK	Project area census, harlequin duck survey, big- horn sheep counts, amphi- bian and reptile search.

¹ PN = Pat Nichols
SK = Stacy Kiser
LT - Larry Thompson

Species List Update

The species lists presented in the baseline report (DNRC 1979) were updated.

Project Area Wildlife Census

This census was designed to collect data that would allow comparison of wildlife use of the project area between months and between years. The methods used were patterned after the standard winter bird study (Kolb 1965) and breeding bird census techniques (Hall 1964, Van Valzen 1972) used in the original inventory, but were expanded to include all vertebrate species. The area censused included: the entire Kootenai River and its shorelines from 50 m (164 ft) below the proposed dam outlet to the upper end of the proposed reservoir; the land that would be inundated by the dam at a forebay elevation of 610 m (2,000 ft); the land that would be affected by railroad relocation; and all remaining land between U.S. Highway 2 and the Kootenai River (see appendix B). The entire area was censused for three consecutive days during each of four study periods, following the instructions outlined in the baseline report (DNRC 1979, appendix F).

Bald Eagle Survey

The Kootenai River between Libby and Troy was surveyed for bald eagles on December 30, 1982, and January 1, 1983 (1 count each day), following the methods of Meyer (1979). Observations were made from U.S. Highway 2. Bald eagles seen during project area wildlife censuses and other monitoring field work also were recorded.

Harlequin Duck Special Studies

In addition to surveys made during project area wildlife censuses, special searches of the Kootenai Falls area for harlequin ducks were conducted in May and July-August. In May, emphasis was placed on determining the total harlequin duck population and the number of pairs present in the project area; in July-August, emphasis was placed on locating broods.

Bighorn Sheep Studies

During the study period, several different methods were used to gather information on bighorn sheep. These methods are described below.

Bighorn sheep were observed from strategic viewpoints along U.S. Highway 2 during each of the four survey field trips (table 1). The cliffs north of the Kootenai River within the project area and within 1 mile (upstream) of the project area were surveyed with a spotting scope. The researchers followed a controlled observation schedule. During each survey, the north bank of the river was searched for 10 minutes from each of 10 observation points along U.S. Highway 2. Two such surveys were conducted in January, six in April, three in May, and three in July. Observations of bighorn sheep made during these surveys, as well as those made in conjunction with other field work, were recorded on maps and standard data sheets. Observations of deer also were recorded. In April, the Sheppard Meadows (DNRC 19B1a) were searched for tracks or other evidence of bighorn sheep use.

Amphibian and Reptile Search

During April, May, and July-August, at least four hours each month were spent searching likely habitat in the project area for amphibians and reptiles.

WEATHER

Table 2 summarizes weather data collected at the NOAA Libby recording station (Libby 1 NE Ranger Station) for the period August 1982 through August 1983. The data show that the winter of 1982-83 was much warmer and drier than normal. Average monthly temperatures ranged from 0.7 to 7.6 Fahrenheit degrees (averaging 4.2 degrees) above normal from December through March. Monthly precipitation was near normal throughout this period. Snowfall, which totalled 39 inches, occurred during the period November through April. Although data on average snowfall at this recording station are not available, snowfall during the same period the previous winter, November 1981 through April 1982, totalled 46.9 inches. Snow depths in 1981-82 were relatively low; the greatest depth (15 inches) was recorded in December 1982. During the winter of 1981-82, the maximum snow depth (26.7 inches) occurred in January.

Table 2. Summary of weather parameters at Libby, August 1982-July 1983

Month	Temperature ¹ (degrees F.)	Precipitation ² (inches)	Snowfall (inches)	Maximum Snow Depth on Ground (inches)
August 1982	65.8(+0.5)	0.9(-0.2)	0	0
September 1982	56.3(-0.5)	1.2(-0.1)	0	0
October 1982	44.4(-1.1)	1.3(-0.6)	0	0
November 1982	31.6(-1.6)	2.5(+0.1)	8.3	2
December 1982	26.4(+0.7)	2.8(+0.4)	24.9	15
January 1983	30.3(+7.6)	2.4(-0.2)	4.3	12
February 1983	34.8(+3.8)	1.1(-0.4)	*	6
March 1983	40.7(+4.5)	2.0(+0.8)	0	0
April 1983	45.6(+0.6)	1.1(-0.1)	1.5	0
May 1983	54.6(+0.9)	0.5(-1.0)	0	0
June 1983	60.6(-0.1)	1.7(+0.2)	0	0
July 1983	63.7(-3.0)	2.0(+1.2)	0	0
August 1983	69.2(+3.8)	0.6(-0.5)	0	0

¹ Monthly average (departure from normal)

² Total (departure from normal)

* Data unavailable

RESULTS AND DISCUSSION

Species List Update

During this monitoring period, 77 species of vertebrates were observed--1 amphibian, 1 reptile, 68 birds, and 7 mammals. These included five new species--Wood Duck, Caspian Tern, Eastern Kingbird, Evening Grosbeak, and Clerk's Nutcracker. These new species bring the total number of species observed since the studies began in 1978 to 123 (1 amphibian, 1 reptile, 93 birds, and 28 mammals). Data on these species are summarized in tables 3 and 4. (NOTE: Nomenclature and phylogenetic sequence have been updated to conform to AOU [1983]).

Table 3. Summary of data collected on amphibian, reptile, and bird species observed on the Kootenai Falls study area, January 1978 through August 1982

Species	Habitat ¹	Where Observed ²	Status and Abundance ³														
			This Study	Skær4 (1980)	J	F	M	A	M	J	J	A	S	D	N	D	
					A	E	A	P	A	U	U	E	C	D	E	C	
					N	B	R	R	Y	N	L	G	P	T	V	C	
AMPHIBIANS																	
Coeur D'Alena Salamander	RD	22	NA	NA	-	-	-	A	-	-	-	A	-	-	-	-	
<i>Plethodon yandkei</i>																	
REPTILES																	
Garter Snake	GB	P, 20	NA	NA	-	-	-	-	M	J	-	-	-	-	-	-	
<i>Thamnophis</i> spp.																	
BIRDS																	
Great Blue Heron	GB, SW, ER	C, D, F, J, H, L, M, N, O, P, Q	a-U	Bw	J	-	-	A	M	J	J	A	-	O	-	D	
<i>Ardea herodias</i>																	
Canada Goose	SW, GB, RG	C, D, E, M, N	B-C W-C	Bw	J	F	M	A	M	J	-	A	-	-	-	D	
<i>Branta canadensis</i>																	
Wood Duck	SW	P, S	sm-U	b	-	-	-	A	-	-	-	-	-	-	-	-	
<i>Aix sponsa</i>																	
Green-winged Teal	GB, SW	D	sm-U	Bw	-	-	-	A	-	-	-	-	-	-	-	-	
<i>Anas crecca</i>																	
Mallard	SW, FW, GB, FA, ER, AV, CH	D, F, H, L, M, N, O, P, Q, R, S, T	W-A, B-A	BW	J	F	M	A	M	J	J	A	S	-	N	O	
<i>Anas platyrhynchos</i>																	
Blue-winged Teal	GB, SW	M, O	a-R	B	-	-	-	-	-	J	-	-	-	-	-	-	
<i>Anas discors</i>																	
Gadwall	GB, SW	O	fm-U	b	-	-	-	-	-	-	-	-	-	D	-	-	
<i>Anas strepera</i>																	
American Wigeon	SW, GB	M	sm-R	B	-	-	-	A	M	-	-	-	-	-	-	-	
<i>Anas americana</i>																	
Hartaquin Duck	FA, FW, ER, BR, SW	F, G, H, J, L, M, N	B-U	b	-	-	-	A	M	J	J	A	-	O	-	-	
<i>Histrionicus histrionicus</i>																	
Common Goldeneye	SW, ER, FW, GB, FA	E, F, H, M, N, O, P, Q, R, S, T	W-A, B-A	BW	J	F	M	A	M	J	-	-	-	-	D	-	
<i>Bucephala clangula</i>																	
Barrow's Goldeneye	SW, ER	M	b-U	BW	-	-	-	A	M	-	-	-	-	-	-	-	
<i>Bucephala islandica</i>																	
Bufflehead	SW, AV	M	a-R	Bw	-	-	-	-	-	-	-	A	-	-	-	-	
<i>Bucephala albeola</i>																	

Table 3. (continued)

Species	Habitat ¹	Where Observed ²	Status and Abundance ³		This Study												Skeer ⁴ (1980)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
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Table 3. (continued)

Species	Habitat ¹	Where Observed ²	Status and Abundance ³ This Study	Skaer ⁴ (1980)	J	F	M	A	M	J	J	A	S	O	N	D
Mourning Dove <u>Zenaidura macroura</u>	RR, DS, PR	21, 20	W-R, b-U	bw	-	F	-	-	M	J	-	A	-	-	-	-
Common Nighthawk <u>Chordeiles minor</u>	FA	L	s-U	B	-	-	-	-	-	-	-	J	A	-	-	-
Black Swift <u>Cypseloides niger</u>	OA	L	s-R	b	-	-	-	-	-	-	-	J	A	-	-	-
Vaux's Swift <u>Chaetura vauxi</u>	OA	L, M	sm-U	b	-	-	-	-	M	-	-	-	-	-	-	-
White-throated Swift <u>Aeronautes saxatilis</u>	DA	M	e-R	b	-	-	-	-	-	-	-	-	A	-	-	-
Calliope Hummingbird <u>Stellula calliope</u>	PR, RR, RO, DS	22	s-R	B	-	-	-	-	-	-	-	J	-	-	-	-
Rufous Hummingbird <u>Selasphorus rufus</u>	DS	21	s-U	B	-	-	-	-	M	J	-	-	-	-	-	-
Belted Kingfisher <u>Megascops asio</u>	SW	D, N	W-R, s-U	BW	-	F	-	-	M	-	J	A	-	-	-	-
Downy Woodpecker <u>Picoides pubescens</u>	RR	21	t-R, w-R	bw	J	-	-	-	-	-	-	-	-	0	-	-
Hairy Woodpecker <u>Picoides villosus</u>	DW, RC, CC, SD	18, 21	W-R, s-R	BW	J	-	-	-	M	-	-	-	-	-	-	-
Northern Flicker <u>Colaptes auratus</u>	RC, CC, SD, DW, ON	21	s-U	BW	-	-	-	-	A	M	J	J	A	0	-	-
Pileated Woodpecker <u>Dryocopus pileatus</u>	DW	18, 22	W-R, s-R	bw	J	-	-	-	A	-	J	-	-	-	-	-
Willow Flycatcher <u>Empidonax traillii</u>	WT, BA	10, 21	b-U	b	-	-	-	-	M	J	-	-	-	-	-	-

Table 3. (continued)

Species	Habitat ¹	Where Observed ²	Status and Abundance ³		J F M A M J J A S O N D												
			This Study	Skaer ⁴ (1980)	A E A P A U U L G P T V C												
Flycatcher (sp., undeterm.) <u>Empidonax</u> sp.	DW, AO, DS, DN	17, 19, 21, 22	b-U		-	-	-	-	M	J	-	-	-	-	-	-	-
Eastern Kingbird <u>Tyrannus tyrannus</u>	RC	21	t-R	B	-	-	-	-	-	-	J	-	-	-	-	-	-
Trees Swallow <u>Iridoprocne bicolor</u>	OA, SD	L, M, 21	B-U	B	-	-	-	-	-	M	J	J	-	-	-	-	-
Violet-green Swallow <u>Tachycineta thalassina</u>	OA, PR, BR	F, G, H, I, J, K, L, M, 21	b-A	B	-	-	-	-	A	M	J	J	A	-	-	-	-
Northern Rough-winged Swallow <u>Stelgidopteryx serripennis</u>	OA, BR	F, G	B-U	B	-	-	-	-	-	M	J	J	-	-	-	-	-
Barn Swallow <u>Hirundo rustica</u>	OA, PR	21	b-U	B	-	-	-	-	-	-	J	-	A	-	-	-	-
Stellar's Jay <u>Cyanocitta stelleri</u>	DW	22	f-m-R	bW	J	-	-	A	-	-	-	-	-	-	-	-	-
Clerk's Nutcracker <u>Nucifraga columbiana</u>	CC	21	b-R	bW	-	-	-	A	-	-	-	-	-	-	-	-	-
American Crow <u>Corvus brachyrhynchos</u>	DW, PD, DS, DN, DA, ER, RC, CC	L, B, 17, 18, 19, 20, 21, 22, 23, 24	W-A, b-A	b	J	F	M	A	M	J	J	A	-	-	-	-	-
Common Raven <u>Corvus corax</u>	DW, PD, RD, DS, DN, OA, RC, CC	M, B, 10, 26, 25, 22, 21, 20	W-C, B-C	BW	J	-	-	A	M	J	J	A	-	-	-	-	-
Black-capped Chickadee <u>Parus atricapillus</u>	DW, DS, CC, BA, SD, DN	19, 20, 21, 22, 23, 24	W-A, B-A	BW	J	F	M	A	M	J	J	A	-	-	-	-	-
Mountain Chickadee <u>Parus gambeli</u>	DW	22	f-m-U	BW	J	-	-	-	-	-	-	-	-	-	-	-	-
Boreal Chickadee <u>Parus hudsonicus</u>	BA	19	t-R	bW	-	-	-	A	-	-	-	-	-	-	-	-	-
Chestnut-backed Chickadee <u>Parus rufescens</u>	DS, BA	21	W-U, B-U	bW	J	-	-	A	-	-	-	-	-	-	-	-	-
Red-breasted Nuthatch <u>Sitta canadensis</u>	DW, DS	22	W-U, e-U	BW	J	-	M	A	-	J	-	-	-	-	-	-	-
Brown Creeper <u>Certhia familiaris</u>	DW	22	W-R	BW	-	F	-	-	-	-	-	-	-	-	-	-	-

Table 3. (continued)

Species	Habitat ¹	Where Observed ²	Status and Abundance ³		J F M A M J J A S O N D											
			This Study	Skaer ⁴ (1980)												
Dipper	RA, FA, ER, OB, FW	F, H, I, J, L, P, O, 21	W-C, b-C	BW	J	F	M	A	M	J	J	A	S	O	N	D
<u>Cinclus mexicanus</u>																
Canyon Wren	DN	9	b-U	-	-	-	-	-	-	J	-	-	-	-	-	-
<u>Catherpes mexicanus</u>																
Winter Wren	DW	22	e-R, w-R	BW	J	-	-	A	M	J	-	-	-	-	-	-
<u>Troglodytes troglodytes</u>																
Golden-crowned Kinglet	DW	3, 4, 17, 18, 20, 21, 22, 23, 24, 25	W-A, b-A	BW	J	F	M	A	M	J	J	-	-	0	-	-
<u>Regulus satrapa</u>																
Ruby-crowned Kinglet	DW, CC	21	b-U	B	-	-	-	A	M	-	-	-	-	-	-	-
<u>Regulus calendula</u>																
Mountain Bluebird	RO, BR	22, J	t-U	B	-	-	-	A	-	J	-	-	-	0	-	-
<u>Sialia currucoides</u>																
Townsend's Solitaire	PO, RO, CC	4, 21	w-U, e-U	BW	-	-	M	A	-	J	-	A	-	D	-	-
<u>Myadestes townsendi</u>																
Veery	CC	21	b-U	b	-	-	-	-	-	-	-	A	-	-	-	-
<u>Catherpes fuscescens</u>																
Swineon's Thrush	DS, DW, DN	3, 4, 13, 20, 21, 22	B-C	B	-	-	-	A	M	J	J	-	-	-	-	-
<u>Catherpes ustulatus</u>																
American Robin	DW, DS, CC, RC, PO, DN, BA, BR, OA	I, N, 5, 8, 13, 20, 21, 22	b-C	BW	-	-	M	A	M	J	J	A	-	-	-	-
<u>Turdus migratorius</u>																
Varied Thrush	DW, DN	8, 20, 21, 22	b-C	Bw	-	-	M	A	M	J	-	-	-	-	-	-
<u>ixoreus naevius</u>																
Gray Catbird	BA, AD	19, 21	b-U	B	-	-	-	-	-	J	-	-	-	-	-	-
<u>Dumetella carolinensis</u>																
Cedar Waxwing	DS, PO, BA	20, 22	e-U	Bw	-	-	-	-	-	J	J	A	-	-	-	-
<u>Bombus cedrorum</u>																
Northern Shrike	CC	19	w-R	tW	J	-	-	-	-	-	-	-	-	-	-	-
<u>Lanius excubitor</u>																

Species	Habitat ¹	Where Observed ²	Status and Abundance ³		J F M A M J J A S O N D											
			This Study	Skeer ⁴ (1980)												
Warbling Vireo <i>Vireo gilvus</i>	AD, CC, RR, DW, BA	21, 22	b-U	B	-	-	-	-	-	J	J	-	-	-	-	-
Red-eyed Vireo <i>Vireo olivaceus</i>	DS, DW, DN, BA	9, 20, 21	b-U	B	-	-	-	-	-	J	-	-	-	-	-	-
Orange-crowned Warbler <i>Vermivora celata</i>	BA, CC, PR, DS	22	b-R	b	-	-	-	-	-	J	-	-	-	-	-	-
Nashville Warbler <i>Vermivora ruficapilla</i>	BA, CC, DS	20, 21, 22	b-C	B	-	-	-	-	M	J	-	-	-	-	-	-
Yellow Warbler <i>Dendroica petechia</i>	DS, WI, BA, CC	20, 21, 22, 23	b-C	B	-	-	-	A	M	J	-	A	-	-	-	-
Yellow-rumped Warbler <i>Dendroica coronata</i>	DW, DS, CC, DN	3, 4, 5, 20, 21, 22	b-A	B	-	-	-	A	M	J	J	A	-	-	-	-
Townsend's Warbler <i>Dendroica townsendi</i>	DW	21, 22	b-U	B	-	-	-	-	-	J	-	-	-	-	-	-
American Redstart <i>Setophaga ruticilla</i>	BA, DW, CC	22	b-U	B	-	-	-	-	-	J	-	-	-	-	-	-
MacGillivray's Warbler <i>Oporornis tolmiei</i>	DW, RR, BA, CC	18, 20, 21, 22	b-C	B	-	-	-	A	M	J	J	-	-	-	-	-
Western Tanager <i>Piranga ludoviciana</i>	DW, DN, DS, PR, CC	20, 21, 22	b-U	B	-	-	-	-	-	J	-	-	-	-	-	-
Lezuli Bunting <i>Passerina amoena</i>	CC, DW, DS	21	e-R	b	-	-	-	-	-	J	-	-	-	-	-	-
Rufous-sided Towhee <i>Pipilo erythrophthalmus</i>	BA	21	b-U	bW	-	-	-	A	-	-	-	-	-	-	-	-
Chipping Sparrow <i>Spizella passerina</i>	DS, DW, CC, DN	4, 19, 20, 21, 22	B-C	B	-	-	-	-	M	J	J	-	-	-	-	-
Lincoln's Sparrow <i>Melospiza lincolni</i>	DW, DS	21, 22	e-R	b	-	-	-	-	M	-	J	-	-	-	-	-
Song Sparrow <i>Melospiza melodia</i>	RR, RG, DS, PR, WI, BA	10, 18, 19, 20, 21, 22	W-U, B-A	BW	J	F	M	A	M	J	J	A	-	D	N	D

Table 3. (continued)

Species	Habitat ¹	Where Observed ²	Status and Abundance ³		J F M A M J J A S O N D											
			Intro Study	Skaneateles ⁴ (1980)	A	E	A	P	A	U	U	E	C	O	D	E
Dark-eyed Junco <i>Junco hyemalis</i>	DW, DN, PO, DS, CC	3, 4, 19, 20, 21, 22, 23	B-C	BW	-	-	-	-	A	M	J	J	A	-	-	-
Snow Bunting <i>Plectrophenax nivalis</i>	PR	21	W-U	W	J	-	-	-	-	-	-	-	-	-	-	-
Western Meadowlark <i>Sturnella neglecta</i>	RG	21	t-R	BW	-	-	-	-	-	-	-	-	-	-	D	-
Brown-headed Cowbird <i>Molothrus ater</i>	PR, ER, DS, CC	L, M, 20, 21	b-C	B	-	-	-	-	M	J	J	-	-	-	-	-
Pine Grosbeak <i>Pinicola enucleator</i>	CC	N	t-R	bW	-	-	-	-	-	-	-	A	-	-	-	-
Red Crossbill <i>Loxia curvirostra</i>	DS, DW, CC, DN	19	B-C	bW	-	-	-	A	-	J	-	-	S	D	-	-
Pine Siskin <i>Carduelis pinus</i>	PO, DW, DN, CC	20, 21	B-C	bW	-	-	-	A	M	J	-	A	-	-	-	-
American Goldfinch <i>Carduelis tristis</i>	CC, RG, DS, DA	M	e-R	bW	-	-	-	-	-	J	-	-	-	-	-	-
Evening Grosbeak <i>Hypericophora yaspertine</i>	CC	20	t-U	bW	-	-	-	A	-	-	-	-	-	-	-	-

Table 3. (continued)

Footnotes:

- 1 Habitat category abbreviations as in appendix A.
- 2 See appendix B for location codes of river stretches (letters) and upland areas (numbers).
- 3 Status: W - Overwinters in area (at least one record each during January and February).
w - Transient in winter.
sm - Spring migrant.
fm - Fall migrant.
B - Breeds on area (nest or dependent young located).
b - Probably breeds on area (territorial males or pairs located).
s - Summers on area in small numbers but no evidence of breeding.
t - Occurs but no evidence of breeding.

Abundance: A - Abundant; found in large numbers in appropriate habitats.
C - Common; found in moderate numbers in appropriate habitats; 15 to 50 registrations.
U - Uncommon; small numbers in appropriate habitats; 2 to 15 registrations.
R - Rare; few sightings; 1 or 2 registrations.
- 4 Indicates status of species in latilong No. 1, as reported by Skaar (1980).
- 5 Months when seen are indicated by letter abbreviations in sequence, January through December [Note: Very little field work was carried out in September and November.]

Table 4. Summary of data collected on general habitat use and local distribution of mammals observed on the Kootenai Falls study area, January 1978–August 1982.

Common Name	Scientific Name	General Habitat Description ¹	Where Observed ²
Masked Shrew	<i>(Sorex cinereus)</i>	Trapped in western red cedar forest (DW)	21
Vagrant Shrew	<i>(Sorex vagrans)</i>	Riparian grassland; Douglas fir & western red cedar forest (RG, DW, DN)	21
Mountain Cottontail	<i>(Sylvilagus nuttallii)</i>	Railroad right-of-way (RR)	21
Snowshoe Hare	<i>(Lepus americanus)</i>	Railroad right-of-way (RR)	21
Golden-mantled Ground Squirrel	<i>(Spermophilus lateralis)</i>	Open, Douglas fir/ponderosa pine forest and acre on north side of river (PD, ST)	4
Columbian Ground Squirrel	<i>(Spermophilus columbianus)</i>	Banks in open areas along railroad tracks; north of river in open Douglas fir–ninebark forest (RR, RG, DN)	3, 4, 20, 21, 22
Red-tailed Chipmunk	<i>(Eutamias ruficaudus)</i>	Railroad right-of-way; talus (RR, ST, PD)	21, 22, 19
Yellow-pine Chipmunk	<i>(Eutamias amoenus)</i>	Railroad right-of-way; talus (RR, ST, PD)	21, 22, 19
Red Squirrel	<i>(Tamiasciurus hudsonicus)</i>	Conifers; several middens in Section 21 (DW, DS, DN)	3, 4, 5, 6, 20, 21, 22, 23, 24
Northern Flying Squirrel	<i>(Glaucomys sabrinus)</i>	Remains discovered in conifers (DW); Trapped in riparian forest (CC)	22
Beaver	<i>(Castor canadensis)</i>	Undercut banks along south shore of river falls and observed in calm water below the falls (WI, SW)	M, N, D, E
Northern Pocket Gopher	<i>(Thomomys talpoides)</i>	Riparian grassland (RG)	
Deer Mouse	<i>(Peromyscus maniculatus)</i>	Coniferous forest, talus (DW, DS, ST, DN) riparian grassland (RG)	21
Red-backed Vole	<i>(Clethrionomys rhabberli)</i>	Western red cedar forest (DW), riparian grassland (RG)	21

Common Name	Scientific Name	General Habitat Description ¹	Where Observed ²
Meadow Vole	<u>(Microtus pennsylvanicus)</u>	Riparian grassland (RG)	21
Long-tailed Vole	<u>(Microtus longicaudus)</u>	Riparian grassland and shrubbery (RG, RC)	21
Muskrat	<u>(Ondatra zibethica)</u>	Below the falls in calm water (SW) Above the falls in calm water, on rocks alongside of Canyon (RO)	E
Meadow Jumping Mouse	<u>(Zapus princeps)</u>	Riparian grassland (RG)	21
Bushy-tailed Woodrat	<u>(Neotoma cinerea)</u>	Steep sidehill, large rocks in timber, 22 railroad right-of-way (RO, RR)	22
Mink	<u>(Mustela vison)</u>	Remains discovered on highway 2	21
River Otter	<u>(Lutra canadensis)</u>	Dense, deciduous bank vegetation and river (SW, AV, ER)	H-N
Coyote	<u>(Canis latrans)</u>	Conifer forests, deciduous vegetation, 21 meadows, shore (DW, RG, GB)	21
Black Bear	<u>(Ursus americanus)</u>	Trail through dense vegetation leading 18 to river; apparently regularly used, Orchard in Sheppard Meadows (OR)	
White-tailed Deer	<u>(Odocoileus virginianus)</u>	Often associated with water and dense brush but also observed in rocky habitats, railroad right-of-way (PO, DS, RR, DW), gravel bar (GB)	5, 6, 9, 13, 0
Mule Deer	<u>(Odocoileus hemionus)</u>	Often observed on steep timbered hillsides but also occurring on the flood plain (PO, DN)	5, 10, 12, 21
Elk	<u>(Cervus canadensis)</u>	Tracks seen in cedar forest (DW) and along railroad ROW (RR)	21
Moose	<u>(Alces alces)</u>	River floodplain and cedar forest (RC, DW)	17, 19
Bighorn Sheep	<u>(Ovis canadensis)</u>	Primarily in Douglas-fir habitat types 1, 2, 3, 4, 5, 6, 7, 8, and associated bluffs, broken terrain, 9, 10, 11, 12, 13 cliffs and peaks north of the river (RO, DN, DS, RG, PO, ST)	

Table 4. (continued)

Footnotes:

- 1 Habitat category abbreviations as in appendix A.
- 2 See appendix B for location codes of river (letters) and upland (numbers) portions of the study area.

Project Area Wildlife Census

Results of the wildlife censuses conducted in the project area during the study period are summarized in table 5.

Table 5. Results of project area wildlife censuses, September 1982-August 1983.

Species	<u>Average number known present per trip</u>			
	Dec.- Jan.	Apr.	May	July- Aug.
<u>REPTILES</u>				
Unidentified Garter Snake	-	-	0.3	0.7
<u>BIRDS</u>				
Great Blue Heron	0.3	1.3	1.0	1.3
Canada Goose	2.7	4.0	6.3	-
Wood Duck	-	0.3	0.6	-
Mallard	13.7	45.7	20.7	5.3
Harlequin Duck	-	1.0	2.3	-
Common Goldeneye	31.0	7.7	0.3	-
Common Merganser	5.0	8.0	2.3	9.0
Unidentified Duck	3.3	-	2.0	-
Osprey	-	-	0.7	3.0
Bald Eagle	1.3	-	-	-
Red-tailed Hawk	-	-	-	0.7
American Kestrel	-	-	0.3	1.7
Ruffed Grouse	-	-	-	0.3
Killdeer	-	2.3	1.7	0.3
Spotted Sandpiper	-	-	11.0	3.3
California Gull	-	0.3	-	1.0
Unidentified Gull	-	-	0.3	0.7
Mourning Dove	-	-	1.3	1.0
Black Swift	-	-	-	0.7
Unidentified Hummingbird	-	-	0.3	1.3
Belted Kingfisher	-	0.7	0.7	0.3
Hairy Woodpecker	-	-	-	0.3
Northern Flicker	-	3.7	1.7	2.0
Pileated Woodpecker	-	-	0.3	-
Unidentified Woodpecker	-	-	0.3	0.3
Empidonax Flycatcher	-	-	0.7	0.3
Eastern Kingbird	-	-	-	0.7
Violet-green Swallow	-	22.0	*	5.3
Northern Rough-winged Swallow	-	-	*	3.0
Barn Swallow	-	-	5.3	5.3
Steller's Jay	0.3	18.3	0.3	-
Common Crow	7.0	30.3	13.0	22.0
Common Raven	0.3	1.3	1.7	2.7
Black-capped Chickadee	3.7	6.7	8.3	14.7

Table 5. (continued)

Species	Average number known present per trip			
	Dec.- Jan.	April	May	July- Aug.
Mountain Chickadee	1.0	-	-	-
Chestnut-backed Chickadee	-	1.0	-	-
Red-breasted Nuthatch	0.3	4.7	1.3	0.7
Winter Wren	0.7	0.3	-	-
Dipper	4.7	3.0	1.7	0.7
Golden-crowned Kinglet	-	26.7	13.0	7.7
Ruby-crowned Kinglet	-	0.3	-	-
Townsend's Solitaire	-	-	0.7	-
Swainson's Thrush	-	-	3.3	1.3
American Robin	-	29.7	16.3	3.7
Varied Thrush	-	18.0	9.7	0.3
Unidentified Thrush	-	-	-	0.3
Cedar Waxwing	-	-	2.3	9.7
Red-eyed Vireo	-	-	3.0	2.3
Nashville Warbler	-	-	1.0	-
Yellow Warbler	-	-	11.7	2.3
Yellow-rumped Warbler	-	-	0.3	0.7
Townsend's Warbler	-	-	-	0.3
American Redstart	-	-	0.3	-
MacGillivray's Warbler	-	-	4.0	0.3
Unidentified Warbler	-	-	1.7	4.3
Western Tanager	-	-	0.3	1.7
Chipping Sparrow	-	-	1.0	1.7
Song Sparrow	0.7	30.0	25.3	15.7
Dark-eyed Junco	-	15.3	2.7	2.7
Brown-headed Cowbird	-	-	3.3	2.0
Pine Grosbeak	-	-	0.3	-
Red Crossbill	-	6.3	-	-
Pine Siskin	-	31.7	12.7	23.3
Evening Grosbeak	-	1.0	-	-
Unidentified Passerine	7.3	-	37.3	21.3
Unidentified Bird	-	0.3	-	-
<u>MAMMALS</u>				
Unidentified Chipmunk	-	6.7	3.0	3.0
Columbian Ground Squirrel	-	-	0.3	0.3
Red Squirrel	0.7	2.0	0.3	14.7
Unidentified Vole	-	-	-	0.3
White-tailed Deer	-	1.7	1.3	0.7
Mule Deer	-	-	-	1.3
Bighorn Sheep	0.3	-	-	1.0

Table 5. (continued)

Species	Total number known present during census period			
	Dec.- Jan.	April	May	July- Aug.
<u>Number of Species</u>				
Water Birds	7	11	13	9
Other Birds	8	18	33	33
All Birds	15	29	46	42
Mammals	2	3	4	7
Total Birds & Mammals	17	32	50	49

* Present in large numbers but no count made.

Seasonal variation in numbers of species encountered during project area censuses each month is shown in figures 1 and 2. Study data show that the number of water-related bird species (waterfowl, shorebirds, herons, gulls, ospreys, bald eagles, dippers, belted kingfishers) remains relatively constant year round, with a slight increase during the breeding season. The number of species of other birds, although relatively high throughout the year, increases considerably during the breeding season.

Census results for the dipper are shown in figure 3, and variations in average monthly abundance of the most common waterfowl species, as determined by the censuses, are portrayed in figure 4. Seasonal variations in duck numbers are shown in figure 5. This figure shows that river sections M and N (see appendix B) are the most heavily used by waterfowl, especially in April.

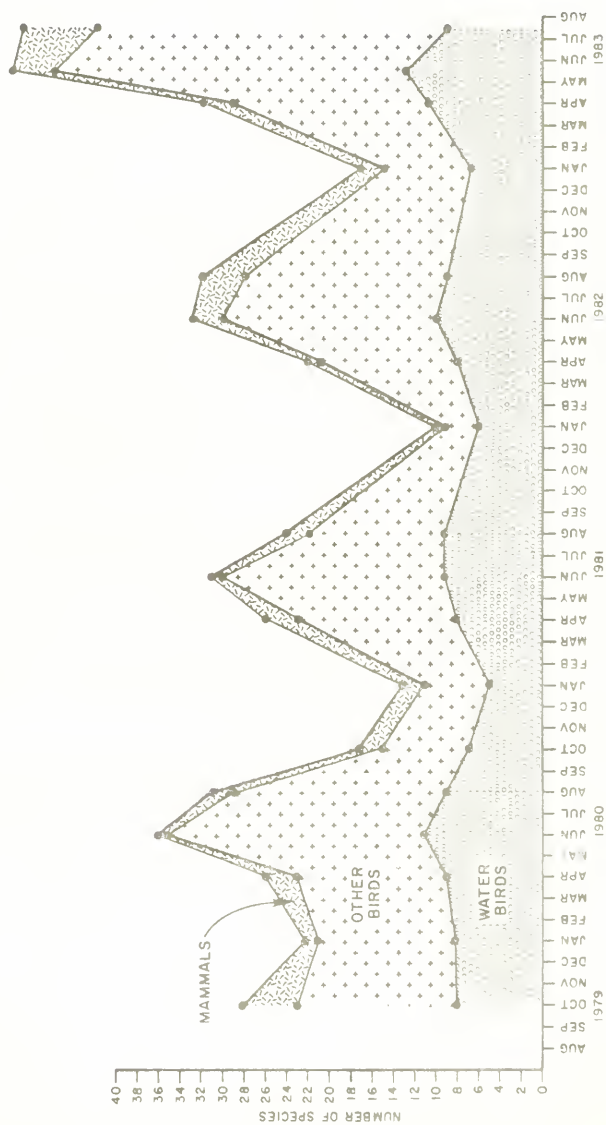


Figure 1. Seasonal variation in total numbers of species encountered during project area censuses, 1979-1983.

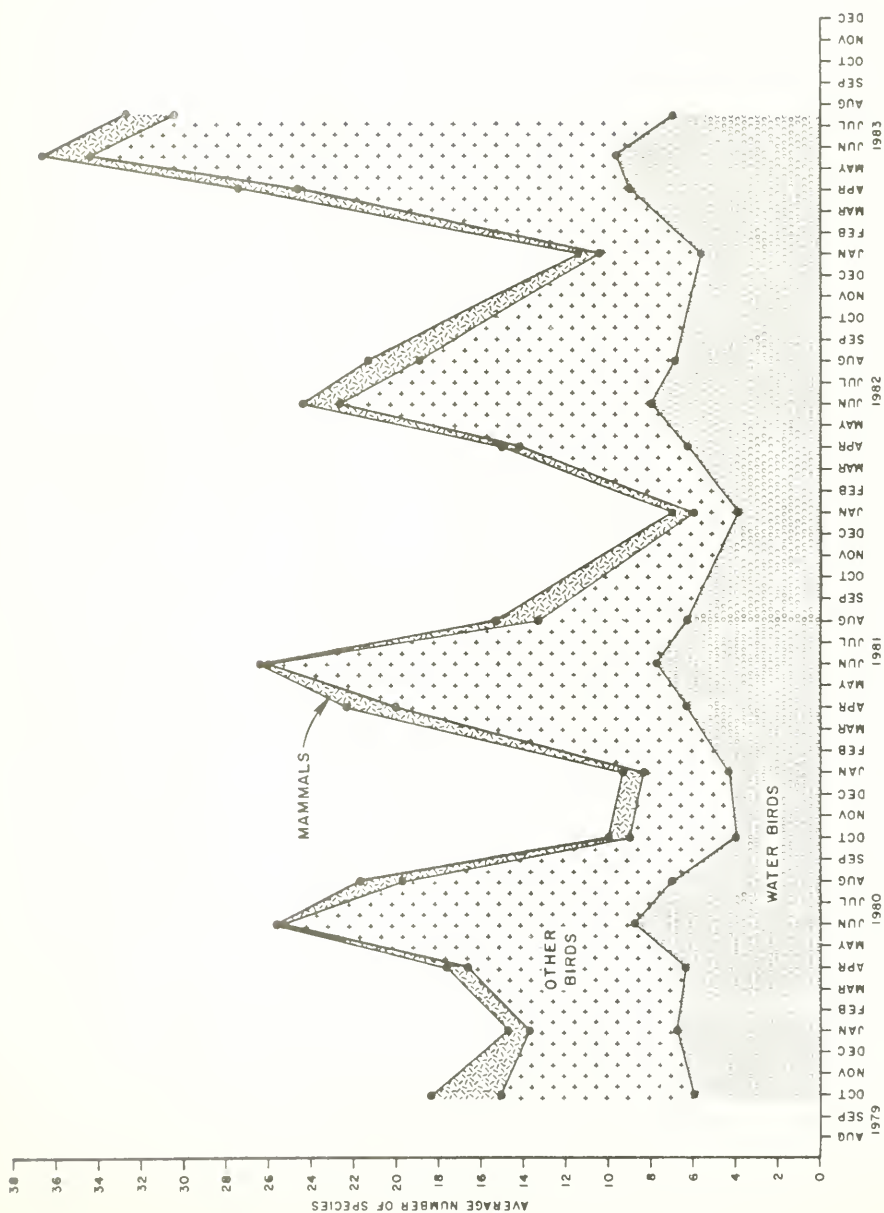


Figure 2. Seasonal variation in average numbers of species encountered during project area censuses, 1979-1983.

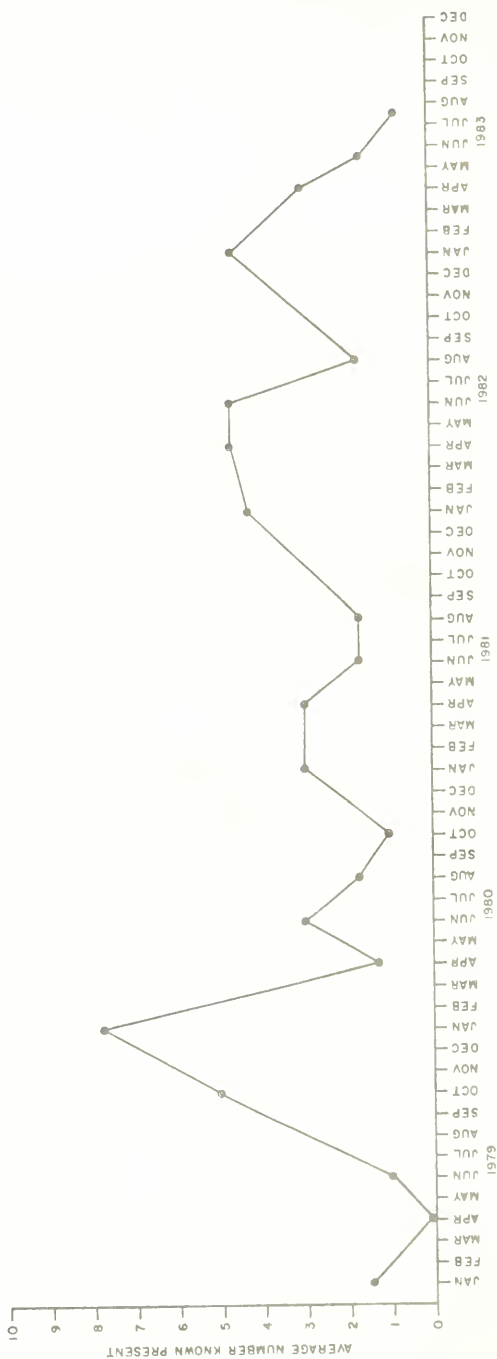


Figure 3. Seasonal variation in average numbers of dippers encountered during project area wildlife censuses, 1979-1983.

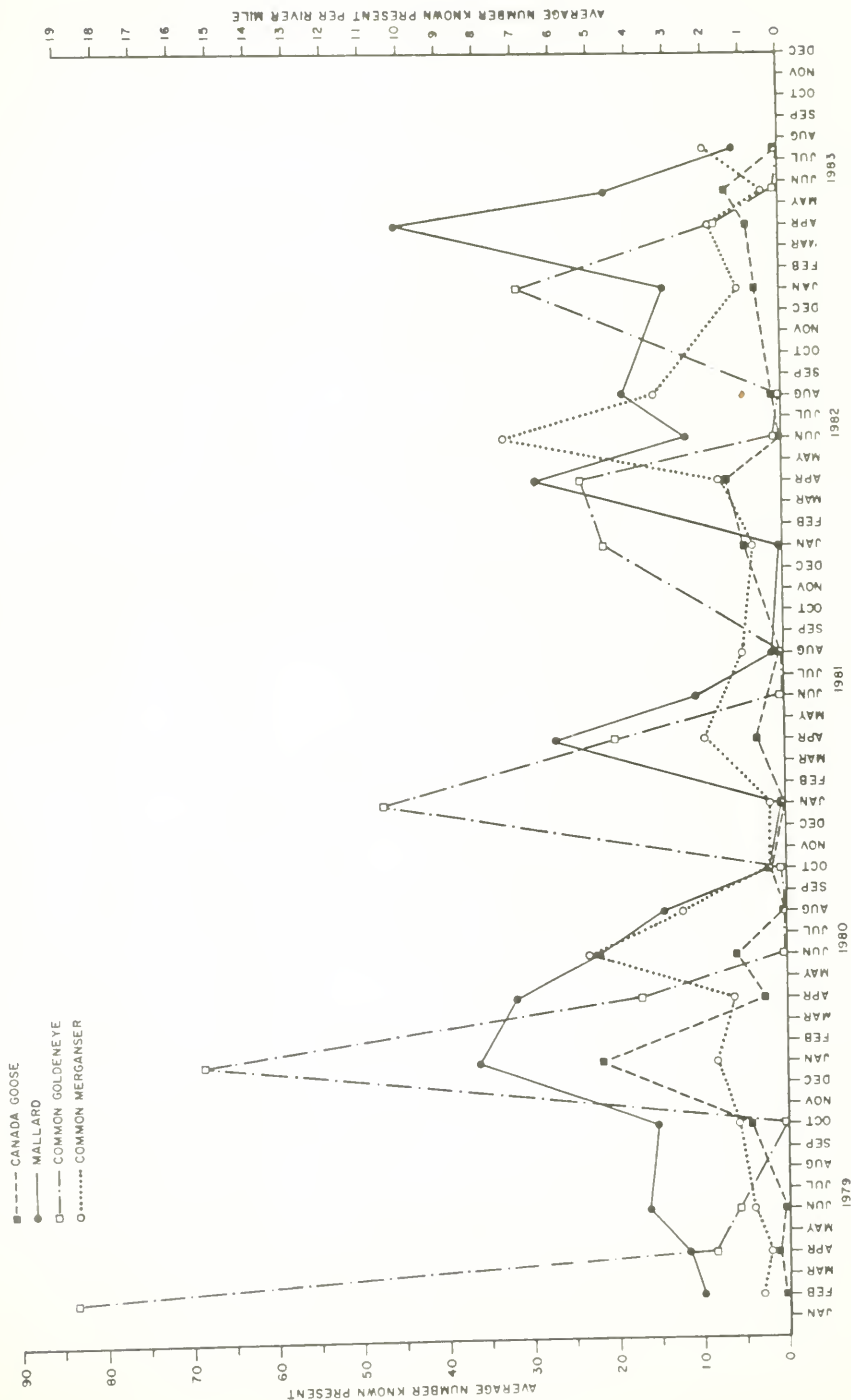


Figure 4. Seasonal variation in average numbers of Canada goose, mallard, common goldeneye, and common merganser encountered during project area wildlife censuses, 1979-1983.



Figure 5. Seasonal variation in duck use of the prairie area.

Bald Eagle Survey

During the monitoring study, bald eagles were observed in December 1982 and January 1983 (table 6).

Table 6. Bald eagle observations made during the monitoring study in the Kootenai Falls area, September 1982–September 1983.

Date	Observer ¹	Location (River Section) ²	Minimum Number Known Present
December 30, 1982	PN	Q,S,T	3 adults ³
December 31, 1982	PN	L,O,Q	4 adults
January 1, 1983	PN	P,T	4 adults
January 2, 1983	PN	N	1 adult

¹ PN=Pet Nichols

² Location codes as in appendix B

³ Observation made during bald eagle surveys

Harlequin Duck Special Studies

Information on harlequin ducks observed during the monitoring period is presented in table 7. During August 1982, DNRC searches for broods were unsuccessful.

Table 7. Harlequin duck observations in the Kootenai Falls area, September 1982-August 1983.

Date	Observer	Minimum number known present				Location (River Section) ¹
		Males	Females	Pairs	Total	
10-24-82	R. Hermesmyer	1 ²	-	-	1	Below Libby Dam
4-12-83	L. Thompson	1	-	-	1	L
4-13-83	L. Thompson	1	-	-	1	I, J, M
4-14-83	L. Thompson	1	-	-	1	L
4-29-83	C. Wolf	1	1	1	2	L
5-1-83	R. Hermesmyer	1	1	1	2	10 mi E Libby
5-7-83	R. Hermesmyer	5	-	-	5	L
5-9-83(?)	C. Wolf	4	1	-	5	L
5-27-83	S. Kiser	2	-	-	2	L
5-28-83	S. Kiser	3	-	-	3	L
5-29-83	S. Kiser	4	-	-	4	L
5-30-83	S. Kiser	4	-	-	4	L
6-1-83	C. Wolf	1	1	1	2	L
6-11-83	C. Wolf	1	1	1	2	L
7-11-83	C. Wolf	1	1	1	2	L
7-27-83	C. Wolf	1	-	-	1	L

¹ Abbreviations as defined in appendix B

² In eclipse plumage

Bighorn Sheep Studies

Locations of bighorn sheep observations recorded during the roadside surveys are shown in figure 6. During censuses of bighorn sheep from U.S. Highway 2 (see table 8), the greatest number of sheep observed on any one census was 35 on May 27, 1983. Late May observations showed higher numbers than in June 1982. A notable census was that of July 30, 1983, when 30 sheep were observed. Prior to 1982, low numbers of sheep had been observed in the area in August. Figure 7 shows seasonal variation in average numbers of sheep observed during the roadside counts.

On April 13, 1983, a ground search on the Sheppard Meadows was conducted. Pellet groups (not identified to species) were observed in all meadows; the heaviest concentrations were in the downstream meadow in and around the orchard. Sheep tracks were observed all along the road that runs through the meadow.

On April 4, 1983, 133 sheep were counted during a MDFWP helicopter survey. A lamb-ewe ratio of 30:100 was obtained, and a ram-ewe ratio of 58:100 was obtained (Brown 1983).

Figure 6. Observations of bighorn sheep during roadside surveys, December 1982-July 1983. (Numbers within symbols indicate group size.)

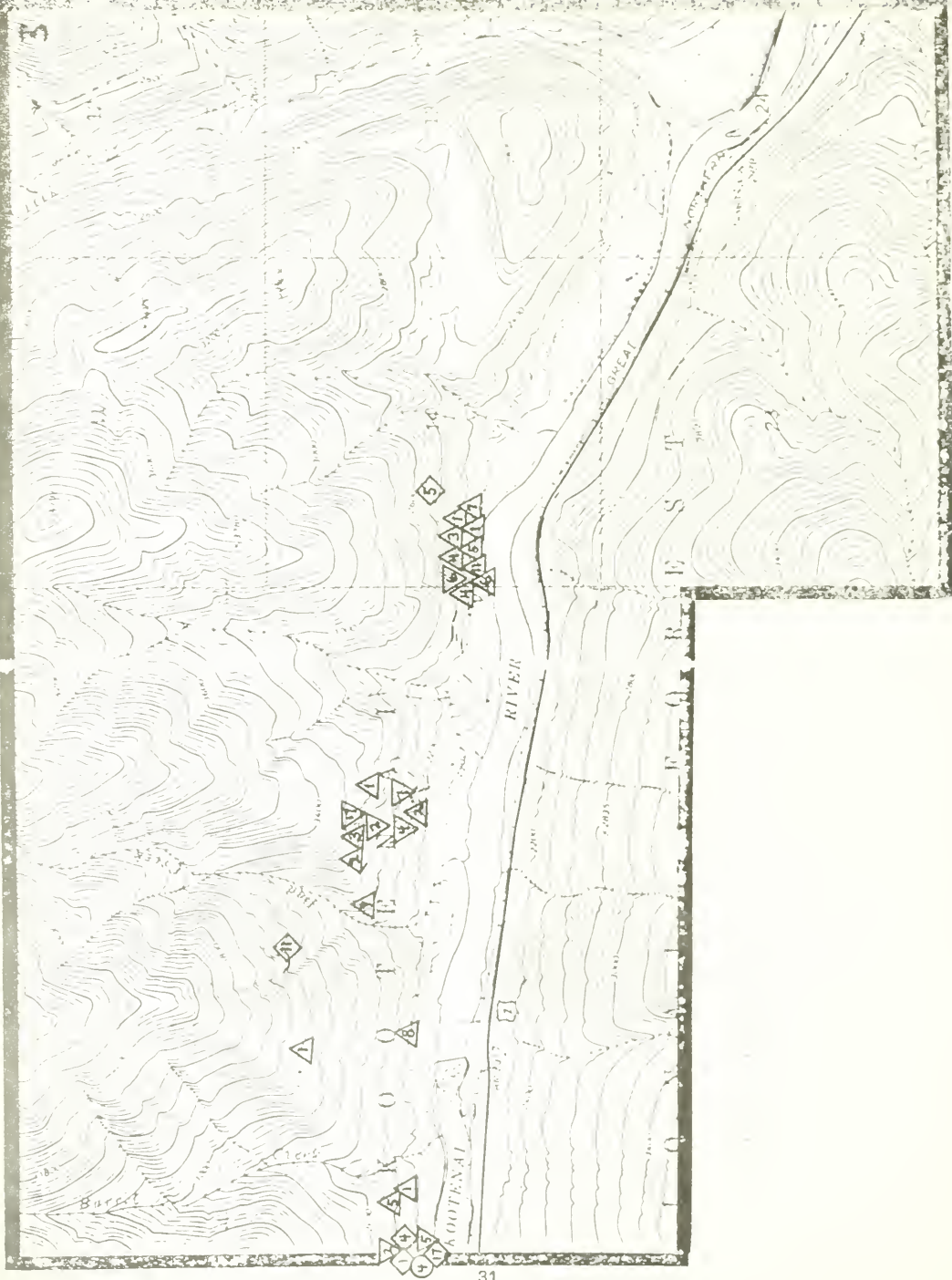
○=Dec. '82-Jan. '83

△=April '83

▽=late May '83

◇=Late July 1983





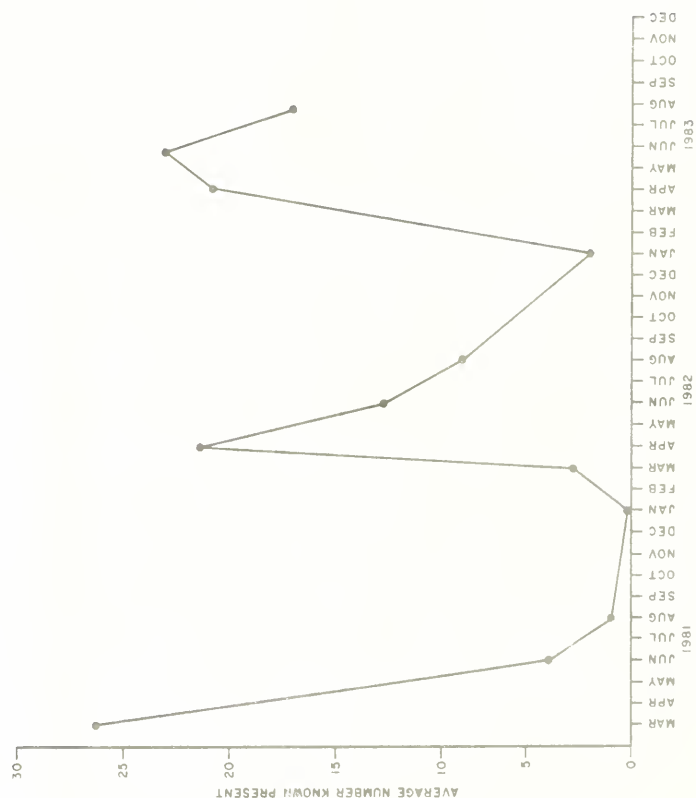


Figure 7. Seasonal variation in average numbers of bighorn sheep observed during roadside surveys.

Table 8. Results of bighorn sheep roadside surveys, Kootenai Falls study area, 1982-83.

Date	Observer ¹	Starting Time	Starting Station No.	No. Obs. Recorded ²	Min. No. Sheep Known Present			Total
					Rams	Ewes	Other ³	
Dec.31, 1982	PN	1245	1	4	2	1	1	4
Jan. 1, 1983	PN	1417	1	0	0	0	0	0
Jan. Average				2.0	1.0	0.5	0.5	2.0
April 11	PN	1710	1	29	12	3	10	25
April 12	PN	0712	10	38	10	5	17	32
April 12	PN	1208	10	9	4	5	0	9
April 12	PN	1644	10	38	8	2	13	23
April 13	PN	0600	1	40	18	4	5	27
April 13	PN	1430	1	13	6	0	3	9
April Average				27.8	9.7	3.2	8.0	20.8
May 27	SK	0530	1	35	4	16	15	35
May 28	SK	1354	1	26	1	7	18	26
May 29	SK	1840	1	12	0	6	2	8
Late May Average				24.3	1.7	9.7	11.7	23.0
July 29	SK	0800	1	20	2	6	12	20
July 30	SK	1830	1	30	0	8	22	30
July 31	SK	1430	10	1	0	0	1	1
Late July Average				17.0	0.7	4.7	11.7	17.0

¹ PN=Pat Nichols, SK=Stacy Kiser

² Includes multiple observations of the same individuals

³ Includes lambs and unclassified sheep

Amphibian and Reptile Search

During the 1982 monitoring period, one Coeur d'Alene salamander was found on April 11, 1983, and unidentified garter snakes were seen on May 28 and July 30, 1983.

ERRATUM

In table 5, p. 20, DNRC 1982, 46.3 should be entered for the March-April census of the Pine Siskin; zero (-) should be entered for the March-April census of the Dark-Eyed Junco.

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Appendix A. Habitat Categories.

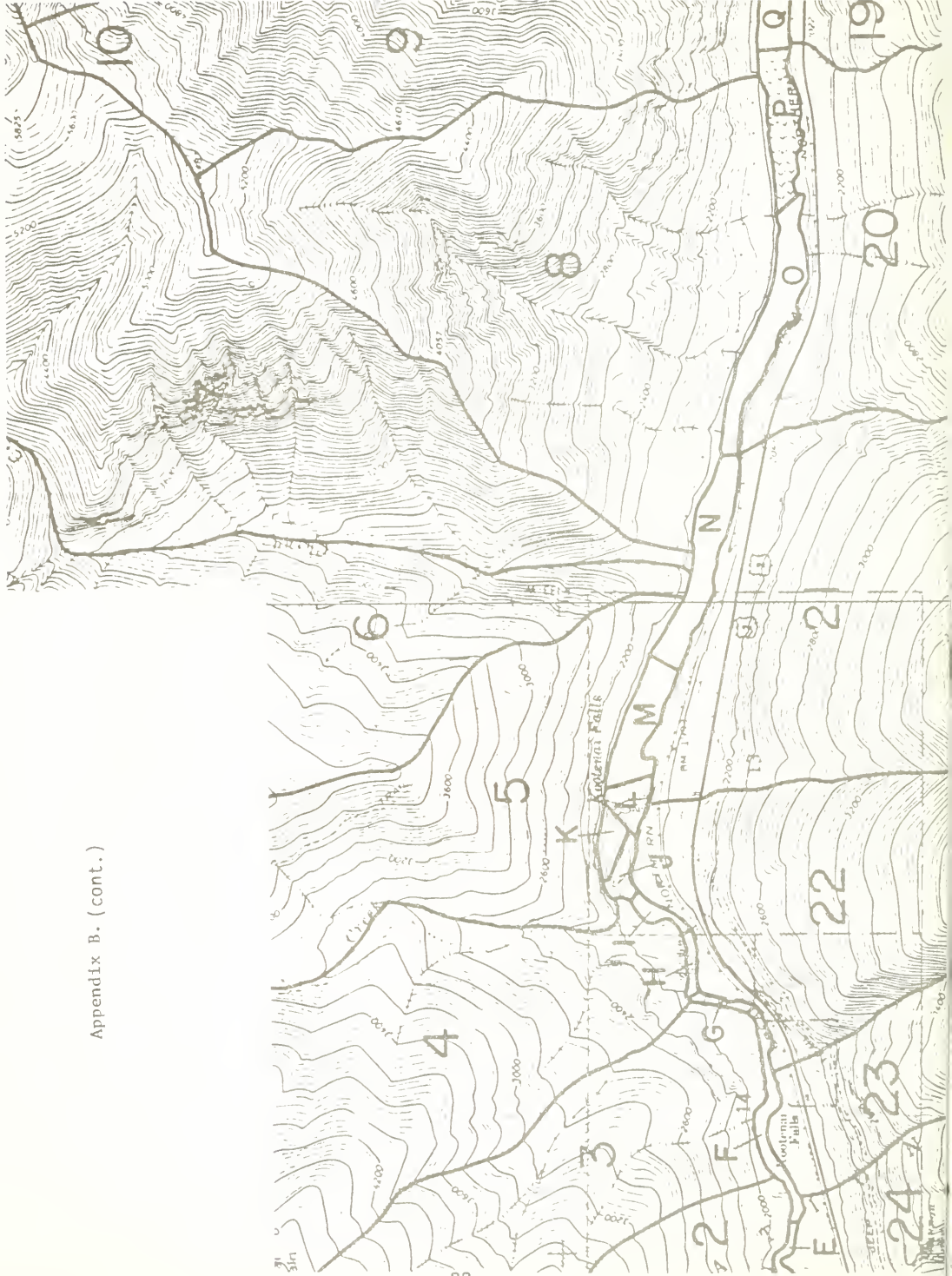
Habitat Category	Abbr.	Component Community Types ¹	Dominant Vegetation
<u>WATER HABITATS</u>			
Heads	RA	-	None--includes fast water broken by shallow rocks
Falls	FA	-	None--includes fast water falling over falls, fast water above and below falls
Slow water	SW	-	None--includes relatively smooth, wide river sections, mostly upstream of falls, with no white water
Fast water	FW	-	None--includes narrowly constricted sections of river, mostly below falls having no white water
Aquatic Vegetation (rooted)	AV	17	<u>Ranunculus aquatilis</u> , <u>Elodea canadensis</u>
<u>SPARSELY VEGETATED HABITATS</u>			
Exposed rock or logjams (in river)	ER	R	None--includes exposed rock in river surrounded by water as well as logjams
Bare rock (upland)	BR	R	None--includes scoured rock along river canyon not surrounded by water
Gravel Bar	GB	12	<u>Tanacetum vulgare</u> , <u>Agrostis alba</u> , <u>Equisetum arvense</u>
Saree and Tatus	ST	S	None--includes steep rockslides adjacent to river
Rocky outcrops (upland)	RO	15	<u>Festuca scabrella</u> , <u>Physocarpus melanocarpus</u> , <u>Philadelphus Lewisii</u>
<u>GRASSLAND AND WOOD HABITATS</u>			
Hiiparian grassland and Hayfields	RG	14,20,25	<u>Phleum pratense</u> , <u>Poa pratensis</u> , <u>Brumus inermis</u> , <u>Auropyron repens</u>
Fescue Grassland	FG	16	<u>Festuca scabrella</u> , <u>Auropyron spicatum</u> , <u>Balsamorhiza hirsuta</u>
Cattail Marsh	CM	13	<u>Typha latifolia</u>
<u>SHRUB HABITATS</u>			
Willow	WI	24	<u>Salix</u> spp., <u>Tanacetum vulgare</u> , <u>Agrostis alba</u>
Birch-Alder-Bogwood	BA	21	<u>Betula occidentalis</u> , <u>Alnus incana</u> , <u>Cornus stolonifera</u>
Alder-Bogwood	AD	11	<u>Alnus incana</u> , <u>Cornus stolonifera</u>
<u>FOREST HABITATS</u>			
Hyperian bottomlands ²	HC	10	<u>Lopulus trichocarpa</u> , <u>Alnus incana</u> , <u>Betula occidentalis</u>
Soft deciduous	SD	10,19,23	<u>Populus trichocarpa</u> (locally)
Coniferous (fir, spruce)	C	9,11	<u>Populus trichocarpa</u> , <u>Psuedotsuga mucronata</u> , <u>Tilia platyphyllos</u>
Intermediate Pine-Spruce	PI	4,5	<u>Pinus strobus</u> , <u>Pinus resinosa</u> , <u>Abies balsamea</u>
Decid. Fir Spruce	DS	6,8	<u>Prunella serotina</u> , <u>Pinus strobus</u> , <u>Abies balsamea</u>
Decid. Fir Spruce	DN	2,3	<u>Prunella serotina</u> , <u>Pinus strobus</u> , <u>Abies balsamea</u>
Decid. Fir Spruce	DM	1,7	<u>Prunella serotina</u> , <u>Pinus strobus</u> , <u>Abies balsamea</u>
Decid. Fir Spruce	DL	1,9,10	Variable
<u>OPEN</u>			
Powerline right-of-way	PH	18	<u>Betula occidentalis</u> , <u>Alnus incana</u> , <u>Agrostis alba</u>
Highland right-of-way	HR	19	<u>Betula occidentalis</u> , <u>Alnus incana</u> , <u>Agrostis alba</u>
Open Air	OA	22	<u>Pyrus malus</u>
	UA	-	None--includes open air of river canyon

- 1 See UNHC 14/9
- 2 Early Successional
- 3 Mid Successional
- 4 Late Successional

Codes used for recording wildlife observations (land areas are numbered, and river sections are lettered).



Appendix B. (cont.)



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TABLE OF CONTENTS

LIST OF FIGURES.....	ii
LIST OF TABLES.....	iii
APPENDICES.....	iv
INTRODUCTION.....	1
METHODS.....	2
Species List Update.....	3
Project Area Wildlife Census.....	4
Bald Eagle Survey.....	4
Harlequin Duck Special Studies.....	5
Bighorn Sheep Studies.....	5
Amphibian and Reptile Search.....	6
Small Mammal Trapping.....	6
WEATHER.....	6
RESULTS AND DISCUSSION.....	7
Species List Update.....	7
Project Area Wildlife Census.....	19
Bald Eagle Survey.....	24
Harlequin Duck Special Studies.....	25
Bighorn Sheep Studies.....	26
Amphibian and Reptile Search.....	30
Small Mammal Trapping.....	30
RECOMMENDATIONS FOR FUTURE MONITORING.....	31
LITERATURE CITED.....	32

LIST OF FIGURES

Figure 1. Seasonal variation in total (top) and average (bottom) numbers of species encountered during project area censuses.....	21
Figure 2. Seasonal variation in average numbers of dippers encountered during project area wildlife censuses.....	22
Figure 3. Seasonal variation in average number of Canada goose, mallard, common goldeneye, and common merganser encountered during project area wildlife censuses.....	23
Figure 4. Observations of bighorn sheep during roadside surveys, September 1981 - September 1982.....	27

LIST OF TABLES

Table 1.	Schedule of September 1981-September 1982 field work, Kootenai Falls wildlife monitoring study.....	3
Table 2.	Summary of weather parameters at Libby, September 1981-July 1982.....	7
Table 3.	Summary of data collected on amphibian, reptile, and bird species observed on the Kootenai Falls study area, January 1978-August 1982.....	8
Table 4.	Summary of data collected on general habitat use and local distribution of mammals observed on the Kootenai Falls study area, January 1978-August 1982.....	16
Table 5.	Results of project area wildlife censuses, September 1981-August 1982.....	19
Table 6.	Bald eagle observations made during the monitoring study in the Kootenai Falls area, September 1981-September 1982.....	24
Table 7.	Harlequin duck observations in the Kootenai Falls area, September 1981-August 1982.....	25
Table 8.	Results of bighorn sheep roadside surveys, Kootenai Falls study area, 1982.....	29
Table 9.	Kootenai Falls small mammal trapping results, August 1982.....	30

APPENDICES

A. Habitat Categories.....	33
B. Codes Used for Recording Wildlife Observations.....	34

INTRODUCTION

Northern Lights, Inc. (NLI), a rural electric cooperative based in Sandpoint, Idaho, submitted an application to the Montana Department of Natural Resources and Conservation (DNRC) in 1980 to build a hydroelectric dam and generating plant, known as the Kootenai River Hydroelectric Project, in the Kootenai Falls area of Lincoln County, Montana. In 1978, NLI contracted with DNRC to conduct a baseline wildlife investigation in the project area. The results of that study, completed in September 1979, were published later that year (DNRC 1979).

To keep the wildlife data base current and to determine the nature of year-to-year variations in wildlife use of the project area, NLI contracted with DNRC in October 1979 to monitor wildlife in the study area (see DNRC 1979 for a study plan). This study would provide a data base for documenting project-related impacts and for determining the success of mitigation and compensation programs, should the Board of Natural Resources and Conservation issue a certificate for the project at the Kootenai Falls site.

The first annual report (DNRC 1981a) documented results from the first year of the Kootenai Falls wildlife monitoring study (September 2, 1979, through September 1, 1980). The area monitored in that study was the same as the area inventoried during the original baseline study (DNRC 1979, pp. 2-3), although some surveys also were conducted along U.S. Highway 2 between Libby and Troy.

The second annual report (DNRC 1981b) highlighted results from the second year of the Kootenai Falls wildlife monitoring study (September 1, 1980, through August 31, 1981). The area investigated during that monitoring period was basically the same as studied during the first monitoring period. Some modifications in monitoring study design, as suggested in the first annual report (DNRC 1981a) were employed in the second year of monitoring.

This third annual report presents the results from the third year of the wildlife monitoring study (September 1, 1982, through August 31, 1982). The study area was the same as in the past two years of monitoring with some modifications in study design, as suggested in the second annual report.

METHODS

Field techniques and analytical methods used in this study were as described in the baseline studies report (DNRC 1979, pp. 109-112) and the first annual report (DNRC 1981a). A brief summary of methods employed for individual study segments follows (see table 1).

Table 1. Schedule of September 1981 - September 1982 field work,
Kootenai Falls wildlife monitoring study.

Dates	Observer ¹	Type of Field Work
January 6-9, 1982	PN	Riparian wildlife census, bald eagle survey, bighorn sheep counts.
March 4-6, 1982	PN	Bighorn sheep counts, meadow observation
March 29-31, April 1-3, 1982	PN	Riparian wildlife census, bighorn sheep tracking, bighorn sheep count, am- phibian and reptile search
June 12-17, 1982	PN	Riparian wildlife census, harlequin duck survey, big- horn sheep count, amphibian and reptile search.
August 2-5, 1982	PN	Riparian wildlife census, harlequin duck survey, big- horn sheep counts, amphi- bian and reptile search, small mammal trapping.

¹ PN = Pat Nichols

Species List Update

The species lists presented in the baseline report (DNRC 1979) were updated.

Project Area Wildlife Census

This census was designed to collect data that would allow comparison of wildlife use of the project area between months and between years. The methods used were patterned after the standard winter bird study (Kolb 1965) and breeding bird census techniques (Hall 1964, Van Velzen 1972) used in the original inventory, but were expanded to include all vertebrate species. The area censused included: the entire Kootenai River and its shorelines from 50 m (164 ft) below the proposed dam outlet to the upper end of the proposed reservoir; the land that would be inundated by the dam at a forebay elevation of 610 m (2,000 ft); the land that would be affected by railroad relocation; and all remaining land between U.S. Highway 2 and the Kootenai River (see appendix B). The entire area was censused for three consecutive days during each month of January, April, June, and August 1982, following the instructions outlined in the baseline report (DNRC 1979, appendix F).

Bald Eagle Survey

The Kootenai River between Libby and Troy was surveyed for bald eagles on January 6 and 8, 1982 (1 count each day), following the methods of Meyer (1979). Observations were made from U.S. Highway 2. Bald eagles seen during project area wildlife censuses and other monitoring field work also were recorded.

Harlequin Duck Special Studies

In addition to surveys made during project area wildlife censuses, special searches of the Kootenai Falls area for harlequin ducks were conducted in June and August. In June, emphasis was placed on determining the total harlequin duck population and the number of pairs present in the project area; in August, emphasis was placed on locating broods.

Bighorn Sheep Studies

During the study period, several different methods were used to gather information on bighorn sheep. These methods are described below.

Bighorn sheep were observed from strategic viewpoints along U.S. Highway 2 during each of the five survey field trips (table 1). The cliffs north of the Kootenai River within the project area and within 1 mile (upstream) of the project area were surveyed with a spotting scope. The researchers followed a controlled observation schedule. During each survey, the north bank of the river was searched for 10 minutes from each of 10 observation points along U.S. Highway 2. Three such surveys were conducted in January, six in early March, five in late March-early April, three in June, and three in August. Observations of bighorn sheep made during these surveys, as well as those made in conjunction with other field work, were recorded on maps and standard data sheets. Observations of deer also were recorded. In April, the Sheppard Meadows (DNRC 1981a) were searched for tracks or other evidence of bighorn sheep use.

Amphibian and Reptile Search

During April, June, and August, at least four hours each month were spent searching likely habitat in the project area for amphibians and reptiles.

Small Mammal Trapping

Two snap-trap lines (each consisting of 25 stations with two traps per station) were run for three consecutive nights (August 2-4, 1982), one in riparian cottonwoods at the head of Kootenai Falls, and the other in adjacent riparian grassland. Capture data were recorded on standard data sheets.

WEATHER

Table 2 summarizes weather data collected at the NOAA Libby recording station (Libby 1 NE Ranger Station) for the period September 1981 to August 1982. The data show that the winter of 1981-82 was warmer and wetter than normal. Average monthly temperatures ranged from -2.7 to +3.5 degrees Fahrenheit (averaging +1.7 degrees) of normal from November through March, and monthly precipitation averaged 0.8 inches above normal. Snowfall, which totalled 46.9 inches, occurred during the period November through April. Although data on average snowfall at this recording station are not available, snowfall during the same period the previous year, November 1980 through April 1981, totalled 21.5 inches. Snow depths in 1981-82 were relatively high; the greatest depth (26.7 inches) was recorded in January 1982. During the winter of 1980-81, the maximum snow depth (10 inches) occurred in December.

Table 2. Summary of weather parameters at Libby, September 1981-July 1982

Month	Temperature ¹ (degrees F.)	Precipitation ² (inches)	Snowfall (inches)	Maximum Snow Depth on Ground (inches)
September 1981	57.1(+0.3)	0.8(-0.5)	0	0
October 1981	43.4(-2.1)	0.7(-1.3)	0	0
November 1981	35.4(+2.2)	2.6(+0.3)	1.0	1
December 1981	28.0(+2.3)	2.6(+0.3)	12.7	7
January 1982	25.4(+3.0)	2.5(+0.1)	26.7	18
February 1982	27.4(-2.7)	3.1(+1.6)	5.1	15
March 1982	39.2(+3.5)	2.3(+1.0)	*	7
April 1982	42.5(-2.8)	2.6(+1.5)	1.4	0
May 1982	52.0(-2.0)	1.7(+0.2)	0	0
June 1982	63.9(+3.6)	2.9(+1.1)	0	0
July 1982	64.5(-2.5)	1.3(+0.6)	0	0

¹ Monthly average (departure from normal)

² Total (departure from normal)

* Data unavailable

RESULTS AND DISCUSSION

Species List Update

During this monitoring period, 52 species of vertebrates were observed or trapped--47 birds and 5 mammals. These included two new species--the boreal chickadee and the pine grosbeak. These new species bring the total number of species observed since the studies began in 1978 to 118 (1 amphibian, 1 reptile, 88 birds, and 28 mammals). Data on these species are summarized in tables 3 and 4.

Table 3. (continued)

Species	Habitat ¹	Where Observed ²	Status and Abundance ³		J F M A M J J A S O N D											
			This Study	Skaar ⁴ (1980)	A	E	A	P	A	U	U	E	C	O	E	
Hooded Merganser <u>Lophodytes cucullatus</u>	SW	N,O,P	w-H	Bw	J	-	-	-	-	-	-	-	-	-	-	-
Common Merganser <u>Mergus merganser</u>	FW,GB,SW,AV,ER	O,F,G,H,M,N,O,P O,R,S	W-U,B-A	Bw	J	F	M	A	M	J	J	A	S	O	N	-
Red-tailed Hawk <u>Buteo jamaicensis</u>	PO,OA	2,4,8	w-R,S-U	B	-	F	-	-	-	J	-	A	-	O	-	-
Golden Eagle <u>Aquila chrysaetos</u>	PO	6,20	s-R	BW	-	-	-	A	-	-	-	-	-	-	-	-
Bald Eagle <u>Haliaeetus leucocephalus</u>	SD,RC,DS,SC,CC, PO,OA	B,O,E,F,H,M,V, 8,9,13,21	W-U,s-U	LW	J	F	M	A	-	J	J	-	O	N	-	-
Osprey <u>Pandion haliaetus</u>	OA,SW,FW,SD,CC	O,E,M,N,O,P,Q, 7,19,20,21,22,24	b-C	B	-	-	M	A	N	J	J	A	S	-	-	-
Martin <u>Falco columbarius</u>	RO,OS	22	w-u,b-u	bw	J	-	-	-	-	J	-	-	-	-	-	-
American Kestrel <u>Falco sparverius</u>	SC,RO,CC,OS,SD	21,22	B-U	Bw	-	-	-	-	M	J	J	-	-	-	-	-
Ruffed Grouse <u>Bonasa umbellus</u>	OW,DS	B,18,21,22,23	B-U,W-U	BW	-	F	-	A	M	J	-	-	O	-	-	-
Killdeer <u>Charadrius vociferus</u>	GB	O,P,25	B-U	BW	J	-	-	A	M	J	-	-	-	-	-	-
Spotted Sandpiper <u>Actitis macularia</u>	GB,ER,FA	F,J,K,L,M,N,O	b-C	B	-	-	-	-	M	J	J	A	-	-	-	-
California Gull <u>Larus californicus</u>	SW,OA,GB,RO	M	s-u	-	-	-	-	-	-	J	J	-	-	-	-	-
Ring-billed Gull <u>Larus delawarensis</u>	SW,OA,ER	I,L	t U,fm-R	tw	-	-	-	-	-	J	-	-	O	-	-	-

Table 3. (continued)

Species	Habitat ¹	Where Observed ²	Status and Abundance ³		J F M A M J J A S O N D												
			This Study	Skaar ⁴ (1980)	A	E	A	P	A	U	U	E	C	O	E		
Mourning Dove <u>Zenaida macroura</u>	RR, DS, Pk	21, 20	w-R, b-U	hw	-	F	-	-	M	J	-	A	-	-	-	-	-
Common Nighthawk <u>Chordeiles minor</u>	FA	L	s-U	B	-	-	-	-	-	J	A	-	-	-	-	-	-
Black Swift <u>Cypseloides niger</u>	DA	L	s-R	b	-	-	-	-	-	J	A	-	-	-	-	-	-
Vaux's Swift <u>Chaetura vauxi</u>	DA	L, M	sm-U	b	-	-	-	-	M	-	-	-	-	-	-	-	-
White-throated Swift <u>Aeronautes saxatilis</u>	DA	M	s-R	b	-	-	-	-	-	-	A	-	-	-	-	-	-
Calliope Hummingbird <u>Stellula calliope</u>	PR, RR, RU, DS	22	tr	B	-	-	-	-	-	J	-	-	-	-	-	-	-
Rufous Hummingbird <u>Selasphorus rufus</u>	DS	21	tr-U	B	-	-	-	-	M	J	-	-	-	-	-	-	-
Belted Kingfisher <u>Megasceryle alcyon</u>	SW	O, N	w-R, s-U	BW	-	F	-	-	M	-	J	A	-	-	-	-	-
Common Flicker <u>Colaptes auratus</u>	RC, CC, SD, DW, DN	21	B-U	BW	-	-	-	-	A	M	J	J	A	-	B	-	-
Pileated Woodpecker <u>Dryocopus pileatus</u>	DW	18, 22	w-R, s-R	BW	-	-	-	-	A	-	-	-	-	-	-	-	-
Hairy Woodpecker <u>Picoides villosus</u>	DW, RC, CC, SD	18, 21	w-R, s-R	BW	J	-	-	-	M	-	-	-	-	-	-	-	-
Downy Woodpecker <u>Picoides pubescens</u>	RR	21	t-r, u-U	UW	-	-	-	-	-	-	-	-	-	-	-	-	-
Willow Flycatcher <u>Empidonax traillii</u>	WI, BA	10, 21	u-U	b	-	-	-	-	M	J	-	-	-	-	-	-	-

Table 3. (continued)

Species	Habitat ¹	Where Observed ²	Status and Abundance ³		J F M A M J J A S O N D											
			This Study	Skaar ⁴ (1980)	A	E	A	P	A	U	U	E	C	O	E	
Flycatcher (sp. undeterm.) <i>Empidonax</i> sp.	DW,AD,DS,DN	17,19,21,22	b-U		-	-	-	-	M	J	-	-	-	-	-	-
Violet-green Swallow <i>Icthyocata thalassina</i>	DA,PR,BR	F,G,H,I,J,K,L,M, 21	b-A	B	-	-	-	A	M	J	J	A	-	-	-	-
Tree Swallow <i>Iridoprocne bicolor</i>	DA,SD	L,M,21	B-U	B	-	-	-	-	M	J	J	-	-	-	-	-
Rough-winged Swallow <i>Stelgidopteryx ruficollis</i>	DA,BR	F,6	B-U	B	-	-	-	-	M	J	J	-	-	-	-	-
Barn Swallow <i>Hirundo rustica</i>	DA,PR	21	b-U	B	-	-	-	-	J	-	A	-	-	-	-	-
Stellar's Jay <i>Cyanocitta stelleria</i>	DW	22	fm-R	bw	-	-	A	-	-	-	-	-	0	-	-	-
Common Raven <i>Corvus corax</i>	DW,PD,RO,DS,DN,DA, RC,CC	M,8,10,26,25,22, 21,20	W-C,B-C	BW	J	-	A	M	J	J	A	-	0	-	-	-
Common Crow <i>Corvus brachyrhynchos</i>	DW,PD,DS,DN,DA,ER, RC,CC	L,8,17,18,19,20, 21,22,23,24	W-A,b-A	b	J	F	M	A	M	J	J	A	-	0	-	-
Black-capped Chickadee <i>Parus atricapillus</i>	DW,DS,CC,BA,SD,DN	19,20,21,22,23,24	W-A,B-A	BW	J	F	M	A	M	J	J	A	-	0	-	-
Mountain Chickadee <i>Parus gambeli</i>	DW	22	fm-R	BW	-	-	-	-	-	-	-	-	0	-	-	-
Boreal Chickadee <i>Parus hudsonicus</i>	BA	19	t-r	bw	-	-	A	-	-	-	-	-	-	-	-	-
Chestnut-backed Chickadee <i>Parus rufescens</i>	DS,BA	21	w-U,t-U	bw	J	-	A	-	-	-	-	-	-	-	-	-
Red-breasted Nuthatch <i>Sitta canadensis</i>	OW,DS	22	w-R,s-R	BW	-	-	M	-	J	-	-	-	0	-	-	-
Brown Creeper <i>Certhia familiaris</i>	DW	22	w-R	BW	-	-	-	-	-	-	-	-	-	-	-	-

Table 3. (continued)

Species	Habitat ¹	Where Observed ²	Status and Abundance ³		J F M A M J J A S O N D											
			This Study	Skaar ⁴ (1980)	J	F	M	A	M	J	J	A	S	O	N	D
Dipper <u>Cinclus mexicanus</u>	RA, FA, EF, GB, FW	F, H, I, J, L, P, Q, 21	W-C, b-C	BW	J	F	M	A	M	J	J	A	S	O	N	D
Canyon Wren <u>Catherpes mexicanus</u>	IN	9	b-U	-	-	-	-	-	-	-	-	-	-	-	-	-
Winter Wren <u>Troglodytes troglodytes</u>	DW	22	s-R	HW	-	-	-	-	M	-	-	-	-	-	-	-
Gray Cethird <u>Dumetella carolinensis</u>	BA, AD	1, J, 31	b-U	U	-	-	-	-	-	-	-	-	-	-	-	-
American Robin <u>Turdus migratorius</u>	DW, OS, CC, RC, PU, DH, BA, BR, OA	I, N, S, B, 13, 20, 21, 22	b-C	HW	-	-	M	A	M	J	J	A	-	-	-	-
Varied Thrush <u>Ixoreus naevius</u>	DW, DH	8, 20, 21, 22	b	Bw	-	-	N	A	M	J	-	-	-	-	-	-
Swinson's Thrush <u>Catherus ustulatus</u>	OS, DW, DN	3, 4, 13, 20, 21, 22	B-C	B	-	-	-	A	M	J	-	-	-	-	-	-
Veery <u>Catherus fuscescens</u>	OS	21	h-U	b	-	-	-	-	-	-	-	-	-	-	-	-
Mountain Bluebird <u>Sialia currucoides</u>	CO, BR	22, J	t-U	B	-	-	-	-	-	-	-	-	-	-	-	-
Townsend's Solitaire <u>Myadestes townsendi</u>	PO, FO, CA	4, 21	w-U, v-U	BW	-	-	M	A	-	J	-	-	-	-	-	-
Golden-crowned Kinglet <u>Regulus satrapa</u>	FW	3, 4, 17, 18, 20, 21, 22, 23, 24, 25	W-A, b-A	BW	J	F	M	A	M	J	-	-	-	-	-	-
Ruby-crowned Kinglet <u>Regulus calendula</u>	DW, CC	21	b-U	B	-	-	-	-	M	-	-	-	-	-	-	-
Cedar Waxwing <u>Bombycilla cedrorum</u>	OS, PU, BA	20, 22	s-U	Bw	-	-	-	-	-	J	J	-	-	-	-	-
Northern Shrike <u>Lanius excubitor</u>	CC	18	w R	tW	-	-	-	-	-	-	-	-	-	-	-	-

Table 3. (continued)

Species	Habitat ¹	Where Observed ²	Status and Abundance ³		J F M A M J J A S O N															
			This Study	Skear ⁴ (1980)	A E A P A U U F C O E	N B R R Y N L G P T V C														
Red-eyed Vireo <i>Vireo olivaceus</i>	DS,DW,DN,BA	9,20,21	b-U	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Warbling Vireo <i>Vireo gilvus</i>	AD,CC,RR,DW,BA	21,22	b-U	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Orange-crowned Warbler <i>Vermivora corollae</i>	BA,CC,PH,DS	22	b-R	b	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nashville Warbler <i>Vermivora ruficapilla</i>	BA,CC,DS	20,21,22	b-C	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Yellow Warbler <i>Dendroica petechia</i>	DS,WI,BA,CC	20,21,22,23	b-C	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Yellow-rumped Warbler <i>Dendroica coronata</i>	DW,DS,CC,DN	3,4,5,20,21,22	b A	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Townsend's Warbler <i>Dendroica townsendi</i>	DW	21,22	b U	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MacGillivray's Warbler <i>Oporornis tolmiei</i>	DW,RR,BA,CC	18,20,21,22	b-C	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
American Redstart <i>Setophaga ruticilla</i>	BA,DW,CC	22	b-U	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Western Meadowlark <i>Sturnella neglecta</i>	RG	21	t-R	BW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Brown-headed Cowbird <i>Molothrus ater</i>	PR,ER,DS,CC	L,M,20,21	b-C	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Western Tanager <i>Piranga ludoviciana</i>	DW,DN,DS,PR,CC	20,21,22	b-U	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lazuli Bunting <i>Passerina amoena</i>	CC,DW,DS	21	s-R	b	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pine Grosbeak <i>Pinicola enucleator</i>	CC	N	t-R	bW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 3. (continued)

Species	Habitat ¹	Where Observed ²	Status and Abundance ³		J F M A M J J A S O N D											
			This Study	Skaer ⁴ (1980)	A	E	A	P	A	U	U	E	C	D	E	
Pine Siskin <u>Carduelis pinus</u>	PD,DW,DN,CC	20,21	B-C	DW	-	-	-	-	A	M	J	-	-	-	-	
American Goldfinch <u>Carduelis tristis</u>	CC,RG,DS,DA	M	s-R	DW	-	-	-	-	-	J	-	-	-	-	-	
Red Crossbill <u>Loxia curvirostra</u>	DS,DW,CC,DN	19	B-C	DW	-	-	-	-	-	J	-	-	-	-	-	
Rufous-sided Towhee <u>Pipilo erythrophthalmus</u>	BA	21	b-U	DW	-	-	-	-	A	-	-	-	-	-	-	
Dark-eyed Junco <u>Junco hyemalis</u>	DW,DN,PD,DS,CC	3,4,19,20,21,22,23	B-C	BW	-	-	-	-	A	M	J	-	-	-	-	
Chipping Sparrow <u>Spizella passerina</u>	DS,DW,CC,DN	4,19,20,21,22	B-C	B	-	-	-	-	-	M	J	-	-	-	-	
Lincoln's Sparrow <u>Melospiza lincolni</u>	DW,DS	21,22	s-R	b	-	-	-	-	-	M	-	-	-	-	-	
Song Sparrow <u>Melospiza melodia</u>	RR,RC,DS,PR,WI,BA	10,18,19,20,21,22	W-U,B-A	BW	-	-	-	-	F	M	M	J	A	-	N	
Snow Bunting <u>Plectrophenax nivalis</u>	PR	21	w-U	WL	-	-	-	-	-	-	-	-	-	-	-	

Table 3. (continued)

Footnotes:

- 1 Habitat categories abbreviations as in appendix A.
- 2 See appendix B for location codes of river stretches (letters) and upland areas (numbers).
- 3 Status: W - Overwinters in area (at least one record each during January and February).
w - Transient in winter.
sm - Spring migrant.
fm - Fall migrant.
B - Breeds on area (nest or dependent young located).
b - Probably breeds on area (territorial males or pairs located).
s - Summers on area in small numbers but no evidence of breeding.
t - Occurs but no evidence of breeding.

Abundance: A - Abundant; found in large numbers in appropriate habitats.
C - Common; found in moderate numbers in appropriate habitats; 15 to 50 registrations.
U - Uncommon; small numbers in appropriate habitats; 2 to 15 registrations.
R - Rare; few sightings; 1 or 2 registrations.
- 4 Indicates status of species in Latilong No. 1, as reported by Skaar (1980).
- 5 Months when seen are indicated by letter abbreviations in sequence, January through December (Note: Very little field work was carried out in September and November; none was carried out in December).

New entries are listed in italics.

Table 4. Summary of data collected on general habitat use and local distribution of mammals observed on the Kootenai Falls study area, January 1978-August 1982.

Common Name	Scientific Name	General Habitat Description ¹	Where Observed ²
Masked Shrew	(<i>Sorex cinereus</i>)	Trapped in western red cedar forest (DW)	21
Vagrant Shrew	(<i>Sorex vagrans</i>)	Riparian grassland; Douglas fir & western red cedar forest (RG,DW,DN)	21
Mountain Cottontail	(<i>Sylvilagus nuttallii</i>)	Railroad right-of-way (RR)	21
Snowshoe Hare	(<i>Lepus americanus</i>)	Railroad right-of-way (RR)	21
Golden-mantled Squirrel	(<i>Spermophilus lateralis</i>)	Open, Douglas fir, ponderosa pine forest and scree on north side of river (PD,ST)	4
Columbian ground Squirrel	(<i>Spermophilus columbianus</i>)	Banks in open areas along railroad tracks; north of river in open Douglas fir-pine forest (RR,RG,DN)	3,4,20,21,22
Red-tailed Chipmunk	(<i>Eutamias ruficaudus</i>)	Railroad right-of-way; talus (RR,ST,PD)	21,22,19
Yellow-pine Chipmunk	(<i>Eutamias amoenus</i>)	Railroad right-of-way; talus (RR,ST,PD)	21,22,19
Red Squirrel	(<i>Tamiasciurus hudsonicus</i>)	Conifers; several middens in Sauton 21 (DW,DS,DN)	3,4,5,6,20,21,22,23,24
Northern Flying Squirrel	(<i>Glaucomys sabrinus</i>)	Remains discovered in conifers (DW); Trapped in riparian forest (DC)	22
Beaver	(<i>Castor canadensis</i>)	Undercut banks along south shore of river falls and observed in calf water below the falls (WL,SW)	M,N,B,I
Northern Pocket Gopher	(<i>Thomomys talpoides</i>)	Riparian grassland (PD)	
Deer Mouse	(<i>Peromyscus maniculatus</i>)	Coniferous forest, talus (DW,ST,DN); riparian grassland (RG)	1
Red-backed Vole	(<i>Clethrionomys gapperi</i>)	Western red cedar forest (DW); riparian grassland (RG)	21

Table 4. (continued)

Common Name	Scientific Name	General Habitat Description ¹	Where Observed ²
Meadow Vole	[<i>Microtus pennsylvanicus</i>]	Riparian grassland (RG)	21
Long-tailed Vole	[<i>Microtus longicaudus</i>]	Riparian grassland and shrubbery (RG,RC)	21
Muskrat	[<i>Ondatra zibethica</i>]	Below the falls in calm water (SW) Above the falls in calm water, on rocks alongside of Canyon(RG)	E
Meadow Jumping Mouse	[<i>Zapus princeps</i>]	Riparian grassland (RG)	21
Bushy-tailed Woodrat	[<i>Neotoma cinerea</i>]	Steep sidehill, large rocks in timber, 22 railroad right-of-way (RO,RR)	22
Mink	[<i>Mustela vison</i>]	Remains discovered on highway ?	21
River Otter	[<i>Lutra canadensis</i>]	Dense, deciduous bank vegetation and river (SW,AV,ER)	M-N
Coyote	[<i>Canis latrans</i>]	Conifer forests, deciduous vegetation, 31 meadows, shore (DW,RG,GB)	31
Black Bear	[<i>Ursus americanus</i>]	Trail through dense vegetation leading 18 to river; apparently regularly used, <i>Orchard in Shepard Meadows (GR)</i>	18
White-tailed Deer	[<i>Odocoileus virginianus</i>]	Often associated with water and dense brush but also observed in rocky habitats, railroad right of-way (PD,DS,RH,DW), gravel bar (GR)	5,6,9,13,0
Mule Deer	[<i>Odocoileus hemionus</i>]	Often observed on steep timbered hillsides but also occurring on the flood plain (PD,DN)	5,10,12,21
Elk	[<i>Cervus canadensis</i>]	One set of tracks in cedar forest (DW) 21	21
Moose	[<i>Alces alces</i>]	River floodplain and cedar forest (RC,DW)	17,19
Bighorn Sheep	[<i>Ovis canadensis</i>]	Primarily in Douglas-fir habitat types 1,2,3,4,5,6,7,8, and associated bluffs, broken terrain, 9,10,11,12,13 cliffs and parks north of the river (RO,DN,DS,RG,PO,ST)	1,2,3,4,5,6,7,8, 9,10,11,12,13

¹ Habitat category abbreviations as in appendix A.

² See appendix B for location codes of river (letters) and upland (numbers) portions of the study area.

Italics indicate new observations.

Project Area Wildlife Census

Results of the wildlife censuses conducted in the project area during the study period are summarized in table 5.

Table 5. Results of project area wildlife censuses, September 1981-August 1982.

Species	Average number known present per trip			
	Jan.	Mar.- Apr.	June	Aug.
<u>BIRDS</u>				
Great Blue Heron	-	0.3	0.3	-
Canada Goose	4.3	6.7	-	0.7
Mallard	0.3	29.0	10.7	18.3
Common Goldeneye	21.0	23.3	0.3	-
Harlequin Duck	-	-	0.7	0.7
Common Merganser	3.7	7.3	32.7	15.0
Unidentified Duck	-	-	0.3	-
Red-tailed Hawk	-	-	-	0.3
Bald Eagle	0.7	0.3	-	-
Osprey	-	-	2.3	2.0
American Kestrel	-	-	0.3	-
Killdeer	-	-	1.3	-
Spotted Sandpiper	-	-	3.3	1.3
California Gull	-	-	-	0.7
Unidentified Gull	-	-	-	3.7
Mourning Dove	-	-	1.0	4.0
Belted Kingfisher	-	-	-	0.7
Common Flicker	-	-	-	0.7
Pileated Woodpecker	-	0.3	-	-
Downy Woodpecker	0.3	-	-	-
Willow Flycatcher	-	-	1.0	-
Empidonax Flycatcher	-	-	1.3	0.7
Violet-green Swallow	-	5.0	19.3	2.0
Barn Swallow	-	-	0.3	2.3
Stellar's Jay	-	0.3	-	-
Common Raven	1.3	1.3	-	0.3
Common Crow	1.3	13.7	16.0	14.7
Black-capped Chickadee	-	3.0	1.3	1.7
Boreal Chickadee	-	0.7	-	-
Chestnut-backed Chickadee	-	0.7	-	-
Unidentified Chickadee	-	2.0	-	-
Dipper	4.3	4.7	4.7	1.7
Gray Catbird	-	-	1.7	-
American Robin	-	11.7	11.0	1.7
Varied Thrush	-	9.3	0.3	-

Table 5. (continued)

Species	Average number known present per trip			
	Jan.	Mar.- Apr.	June	Aug.
Swainson's Thrush	-	0.3	5.7	-
Veery	-	-	-	1.0
Mountain Bluebird	-	0.3	-	-
Townsend's Solitaire	-	0.3	-	0.7
Cedar Waxwing	-	-	1.3	1.7
Red-eyed Vireo	-	-	2.3	-
Yellow Warbler	-	-	5.7	0.7
Yellow-rumped Warbler	-	-	6.0	2.0
MacGillivray's Warbler	-	-	1.7	-
American Redstart	-	-	1.7	-
Unidentified Warbler	-	-	1.3	-
Brown-headed Cowbird	-	-	1.3	-
Pine Grosbeak	-	-	-	2.7
Pine Siskin	-	-	-	0.3
Dark-eyed Junco	-	46.3	9.0	6.7
Song Sparrow	-	15.3	12.7	5.0
Unidentified Sparrow	-	0.3	-	-
Unidentified Passerine	0.7	5.0	0.7	16.0
<u>MAMMALS</u>				
Unidentified Chipmunk	-	-	2.3	4.3
Tree Squirrel	1.7	-	2.0	5.7
Bighorn Sheep	-	2.0	-	2.7
Unidentified small mammal	-	-	-	0.3
White-tailed Deer	-	-	1.0	-

Seasonal variation in numbers of species encountered during project area censuses each month is shown in figure 1. Study data show that the number of water-related bird species (waterfowl, shorebirds, herons, gulls, ospreys, bald eagles, dippers, belted kingfishers) remains relatively constant year round, with a slight increase during the breeding season. The number of species of other birds, although relatively high throughout the year, increases considerably during the breeding season.

Census results for the dipper are shown in figure 2, and variations in average monthly abundance of the most common waterfowl species, as determined by the censuses, are portrayed in figure 3.

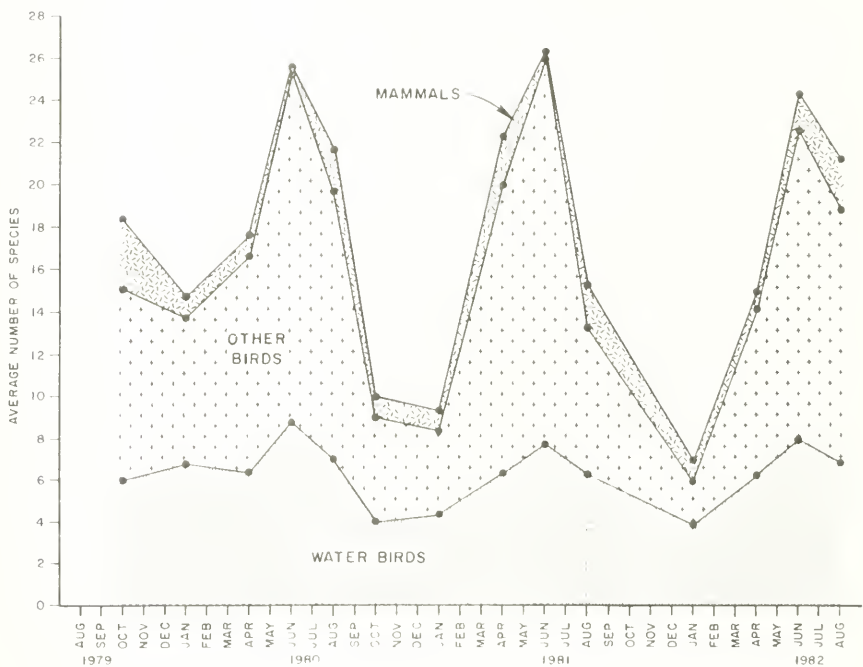
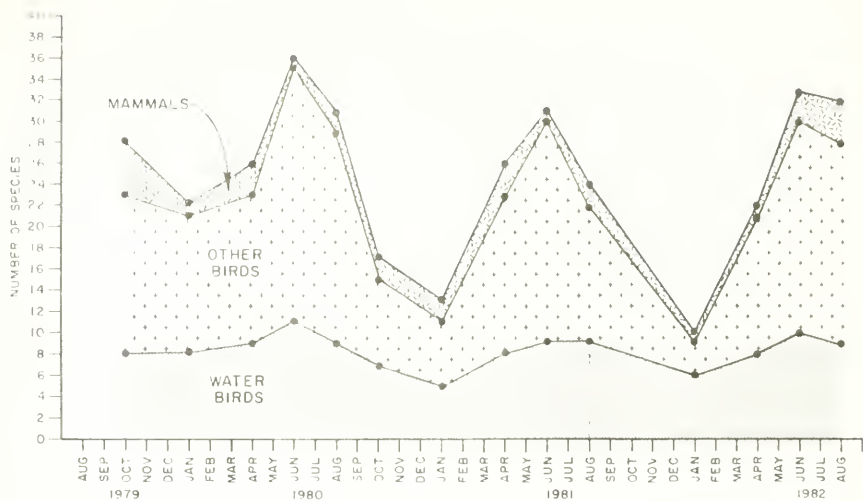


Figure 1. Seasonal variation in total (top) and average (bottom) numbers of species encountered during project area censuses.

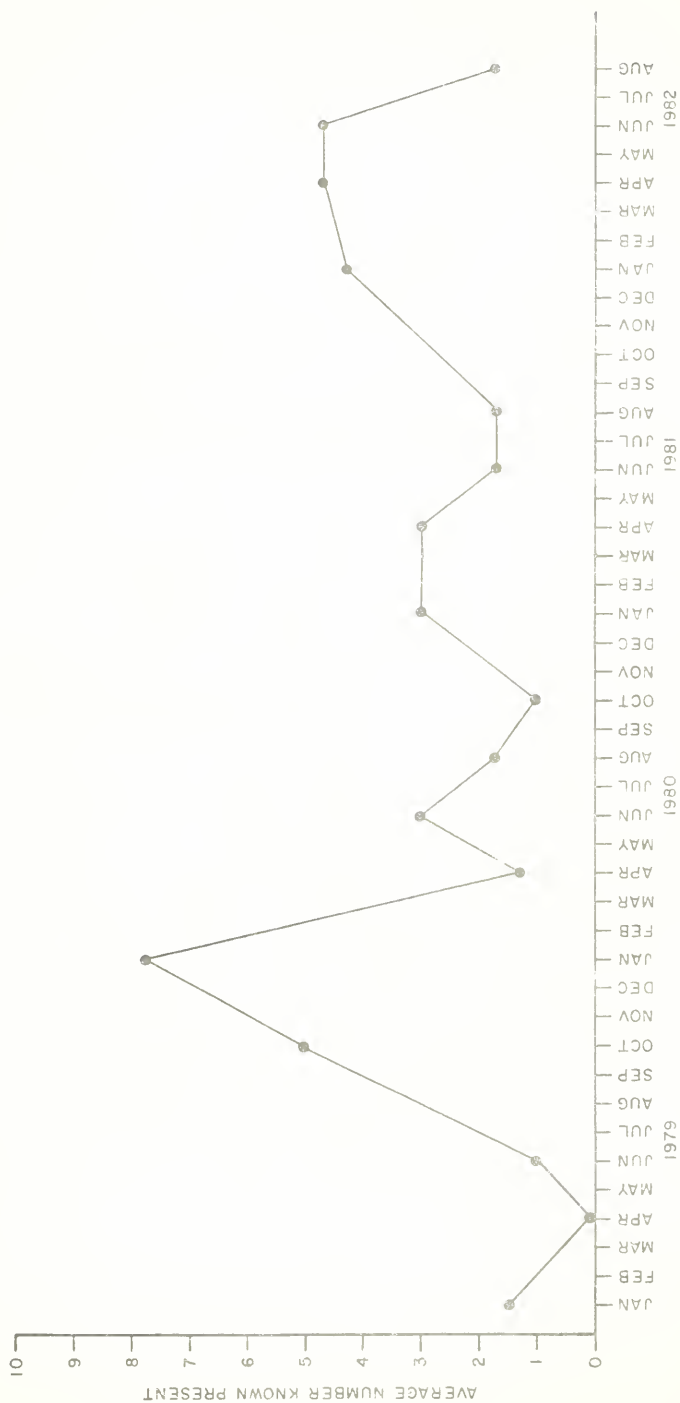


Figure 2. Seasonal variation in average numbers of dipperis encountered during project area wildlife censuses.

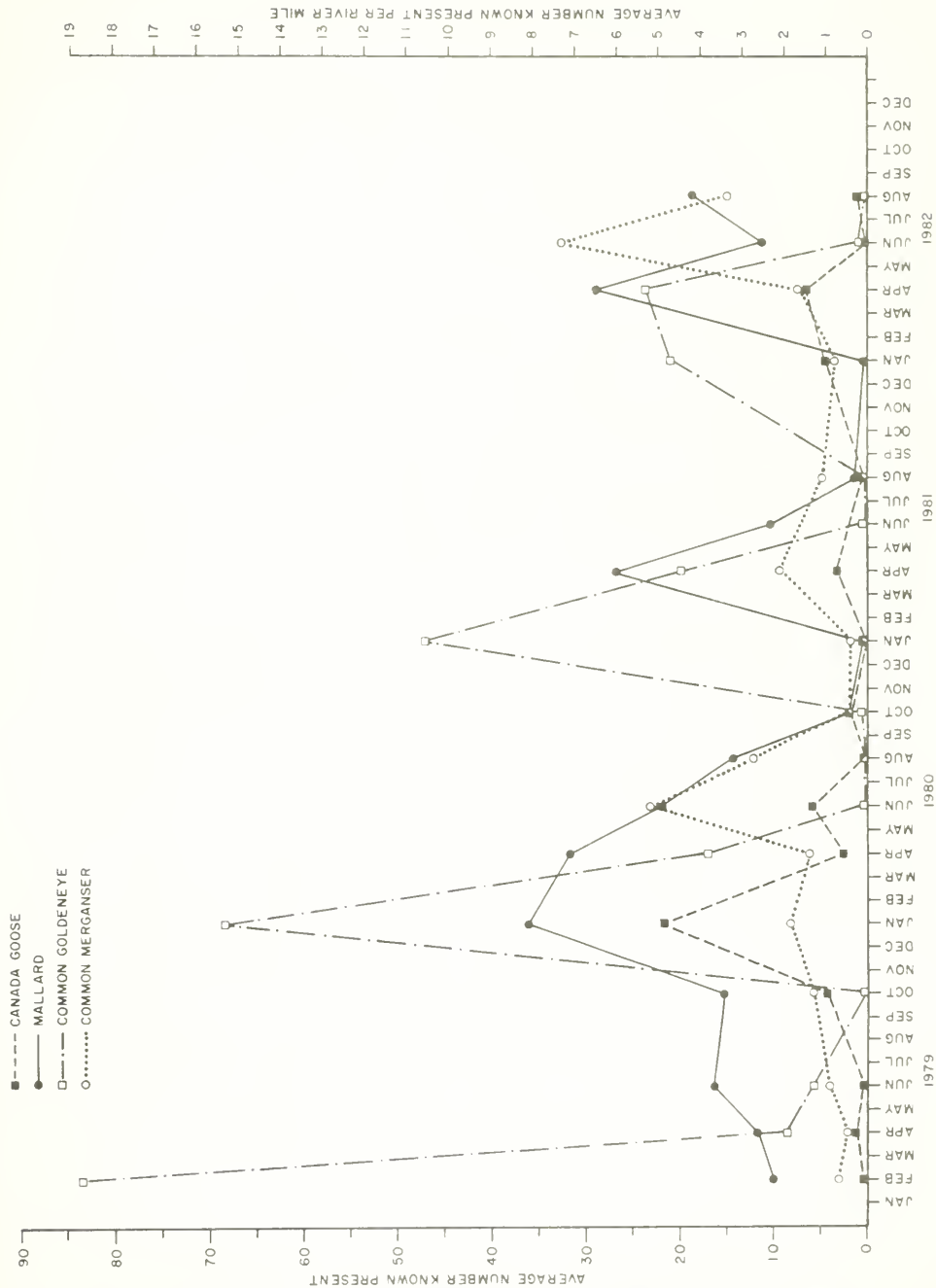


Figure 3. Seasonal variation in average number of Canada goose, mallard, common goldeneye, and common mergansers encountered during project area wildlife censuses.

Bald Eagle Survey

During the monitoring study, bald eagles were observed in January and March 1982 (table 6).

Table 6. Bald eagle observations made during the monitoring study in the Kootenai Falls area, September 1981-September 1982.

Date	Observer ¹	Location (River Section) ²	Minimum Number Known Present
January 6	PN	N	1 adult ³
January 7	PN	L,N,T	3 (2 adults, 1 sub-adult)
January 8	PN	P	2 adults
March 4	PN	P	1 adult
March 5	PN	R	1 adult
March 30	PN	N	1 adult

¹ PN=Pat Nichols

² Location codes as in appendix B

³ Observation made during bald eagle surveys

Harlequin Duck Special Studies

Information on harlequin ducks observed during the monitoring period is presented in table 7. Harlequin ducks were observed in November 1981, and May, June, July, and August 1982. An active nest was discovered in a logjam at the head of the falls and observations of at least two young were made (Wolfe 1982). During August 1982, DNRC searches for broods were unsuccessful.

Table 7. Harlequin duck observations in the Kootenai Falls area, September 1981-August 1982.

Date	Minimum number known present				Location (River Section) ¹
	Males	Females	Pairs	Total	
November 29, 1981 ²	—	1	—	1	P
April 17, 1982 ⁵	1	1	1	2	L
April 24, 1982 ⁵	1	1	1	2	L
April 26, 1982 ⁵	2	1	1	3	L
May 7, 1982 ³	1	1	1	2	Q
May 15, 1982 ³	1	1	1	2	S
May 19, 1982 ⁵	2	1	1	3	L
May 20, 1982 ³	2	2	2	4	P
May 25, 1982 ³	1	1	1	2	M
June 1, 1982 ³	1	1	1	2	S
June 4, 1982 ³	2	1	—	3	J
June 12, 1982 ⁴	1	1	1	2	L
June 13, 1982 ⁴	2	1	—	3	L
June 14, 1982 ⁴	2	1	—	3	L
June 15, 1982 ⁴	1	—	—	1	M
June 17, 1982 ⁴	1	—	—	1	L
June 20-30, 1982 ⁵	1	1	1	4*	L
July 18, 1982 ⁵	0	1	0	3*	L
August 2, 1982 ⁴	2	—	—	2	M

¹ Abbreviations as defined in appendix B

² Shot by hunter — John Jerešek

³ Observed by Paul Hamlin

⁴ Observed by Pat Nichols, DNRC

⁵ Observed by Carl Wolfe, Kootenai National Forest

* Two downy young observed (Wolfe 1982)

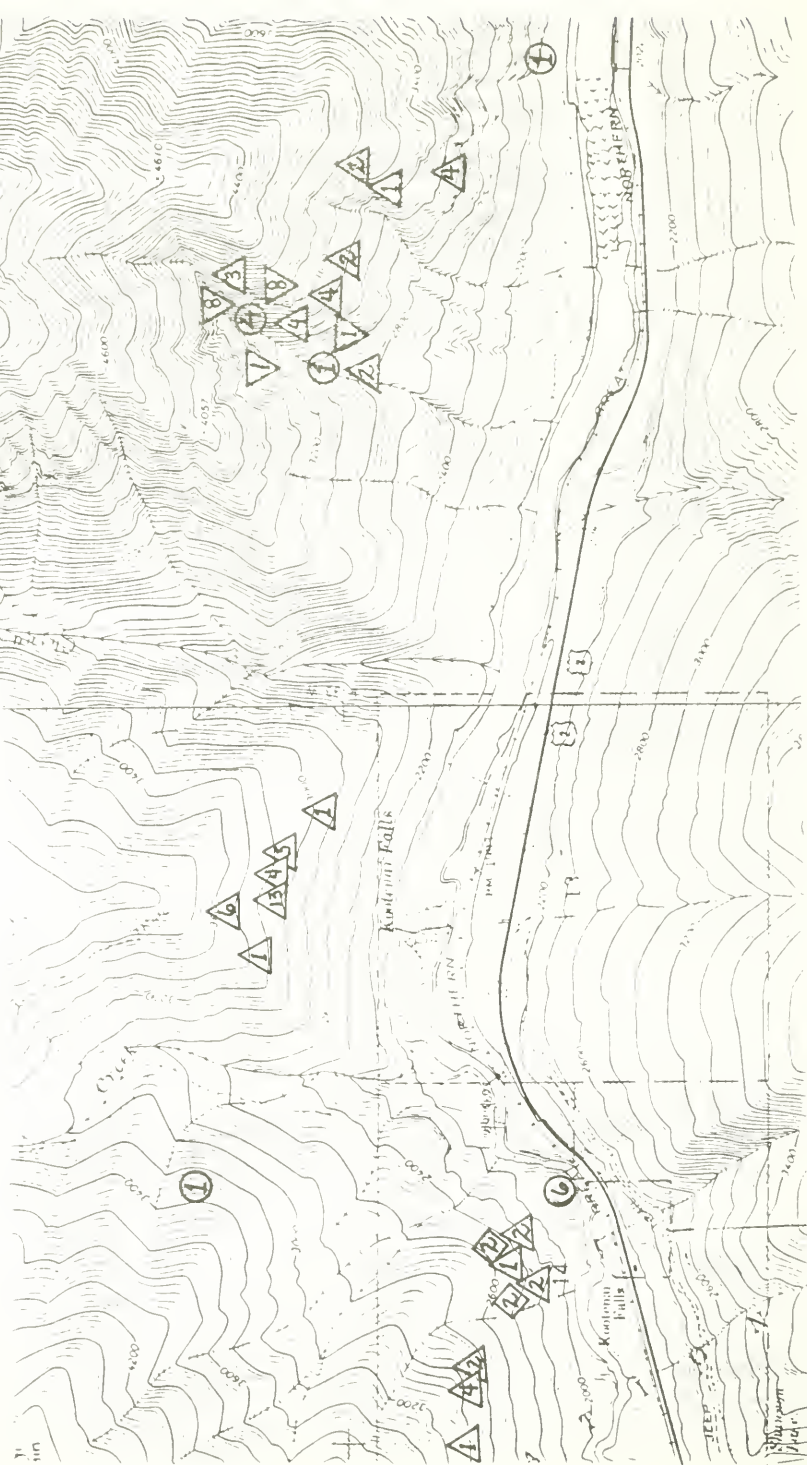
Bighorn Sheep Studies

Locations of bighorn sheep observations recorded during the roadside surveys are shown in figure 4. During censuses of bighorn sheep from U.S. Highway 2 (see table 8), the greatest number of sheep observed on any one census was 51 on April 2, 1982. From early March, the numbers of sheep observed increased through early April. June observations showed lower numbers than in April. A notable census was that of August 5, 1982, when 25 sheep were observed. Prior to 1982, only extremely low numbers of sheep had been observed in the area in August.

On April 2, 1982, a ground search on the Sheppard Meadows was conducted. Eight bighorn rams in two groups were observed on rocks 20 ft. above and 100 ft. to the east of the upstream meadow. Pellet groups (not identified to species) were observed in all meadows; the heaviest concentrations were in the downstream meadow in and around the orchard. Sheep tracks were observed all along the road that runs through the meadow.

September 1981–September 1982. (Numbers within symbols indicate group size.)

- – Early 'larch
- △ – Late March–Early April
- ◐ = June
- ◑ = August



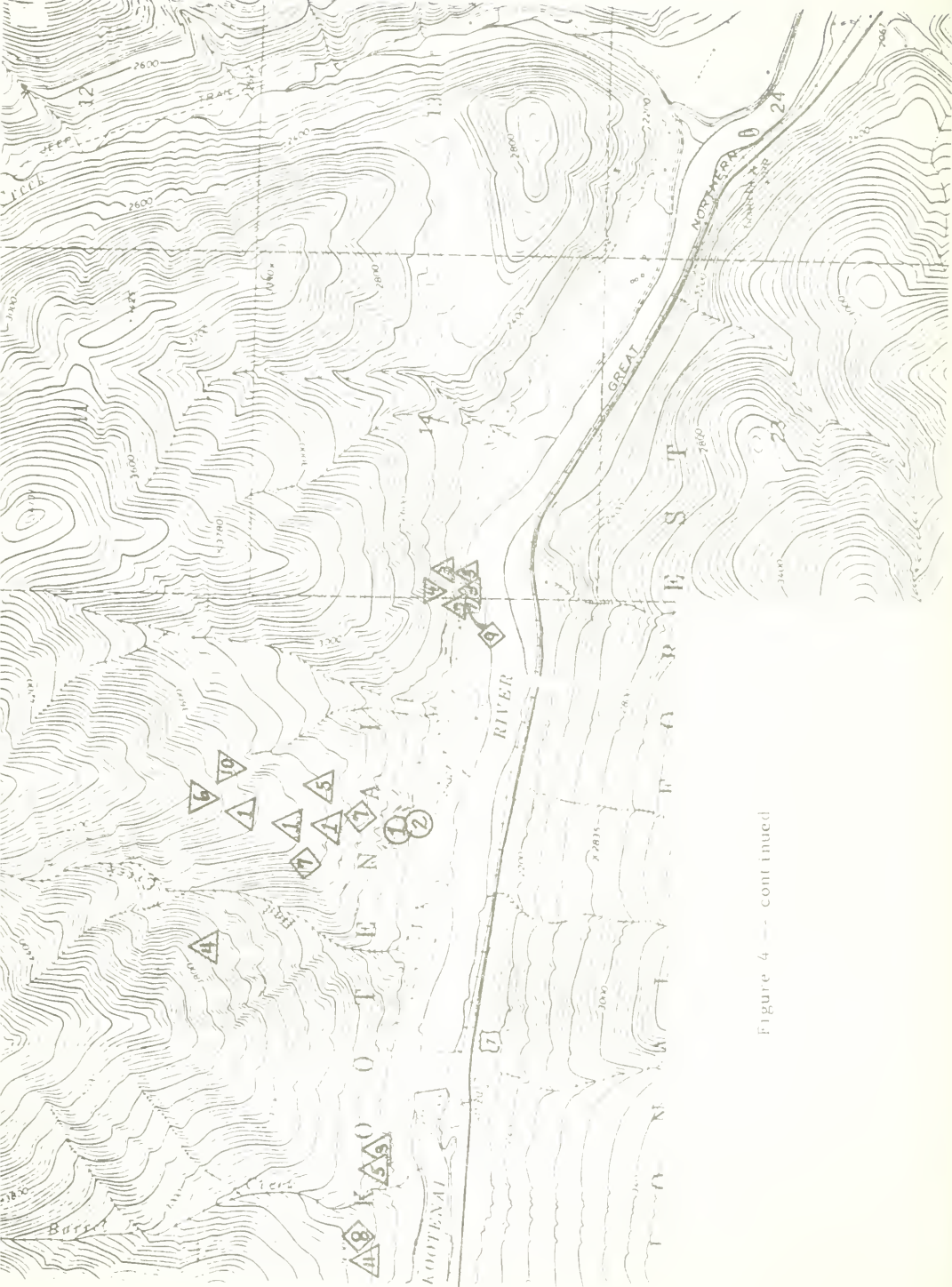


Table 8. Results of bighorn sheep roadside surveys, Kootenai Falls study area, 1982.

Date	Observer ¹	Starting Time	Starting Station No.	No. Obs. Recorded ²	Min. No. Sheep Known Present			Total
					Rams	Ewes	Other ³	
Jan. 6	PN	0920	1	0	0	0	0	0
Jan. 6	PN	1350	1	0	0	0	0	0
Jan. 8	PN	1530	1	0	0	0	0	0
Jan. Average				0.0	0.0	0.0	0.0	0.0
Mar. 4	PN	0830	1	4	1	0	3	4
Mar. 4	PN	1225	10	4	0	0	4	4
Mar. 4	PN	1526	1	1	0	0	1	1
Mar. 5	PN	0850	10	6	6	0	0	6
Mar. 5	PN	1225	1	1	0	0	1	1
Mar. 5	PN	1550	10	0	0	0	0	0
Early Mar. Average				2.7	1.2	0.0	1.5	2.7
Mar. 29	PN	1645	10	13	3	7	3	13
Mar. 30	PN	1420	10	24	2	9	9	20
Apr. 1	PN	1315	1	20	5	4	4	13
Apr. 2	PN	0624	10	56	2	26	23	51
Apr. 2	PN	1707	1	11	3	1	6	10
Late Mar.-Apr. Average				24.8	3.0	9.4	9.0	21.4
June 12	PN	1909	10	19	4	0	15	19
June 13	PN	0730	1	12	10	0	1	11
June 13	PN	1240	1	8	0	4	4	8
June Average				13.0	4.7	1.3	6.7	12.7
Aug. 2	PN	1313	10	2	0	1	1	2
Aug. 4	PN	1753	1	0	0	0	0	0
Aug. 5	PN	0634	10	25	17	3	5	25
Aug. Average				9.0	5.7	1.3	2.0	9.0

¹ PN=Pat Nichols² Includes multiple observations of the same individuals³ Includes lambs and unclassified sheep

Amphibian and Reptile Search

During the 1982 monitoring period, no reptiles or amphibians were observed.

Small Mammal Trapping

Table 9 presents the results of 1982 small mammal trapping.

Table 9. Kootenai Falls small mammal trapping results, August 1982.

	Floodplain Grassland	Riparian Trees and Shrubs	Total
Total number of captures	11	7	18
Total number of species	3	3	5
Total biomass (grams)	255.3	208.9	464.2
Captures per species:			
Masked Shrew (<u>Sorex cinereus</u>)	-	1	1
Deer Mouse (<u>Peromyscus maniculatus</u>)	8	3	11
Long-tailed Vole (<u>Microtus longicaudus</u>)	2	-	2
Meadow Jumping Mouse (<u>Zapus princeps</u>)	1	-	1
Flying Squirrel (<u>Glaucomys sabrinus</u>)	-	2	2

RECOMMENDATIONS FOR FUTURE MONITORING

The monitoring study should be continued, and work should continue toward selection of a suitable control area on the Kootenai River.

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KOOTENAI FALLS

WILDLIFE

MONITORING STUDY

PLEASE RETURN

Second Annual Report

for the period

September 2, 1980 - September 1, 1981

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December 1981

TABLE OF CONTENTS

LIST OF FIGURES	ii
LIST OF TABLES	iii
INTRODUCTION	1
METHODS	2
Species List Update	2
Project Area Wildlife Census	2
Bald Eagle Survey	3
Harlequin Duck Special Studies	3
Bighorn Sheep Studies	3
Amphibian and Reptile Search	3
Small Mammal Trapping	4
Census of Yaak Falls	4
WEATHER	5
RESULTS AND DISCUSSION	6
Species List Update	6
Project Area Wildlife Census	6
Bald Eagle Survey	18
Harlequin Duck Special Studies	22
Bighorn Sheep Studies	22
Amphibian and Reptile Search	26
Small Mammal Trapping	26
RECOMMENDATIONS FOR FUTURE MONITORING	27
ACKNOWLEDGMENTS	28
LITERATURE CITED	29

LIST OF FIGURES

Figure 1.	Seasonal variation in total (top) and average (bottom) numbers of species encountered during project area censuses19
Figure 2.	Seasonal variation in average numbers of dippers encountered during project area wildlife censuses20
Figure 3.	Seasonal variation in average number of Canada goose, mallard, common goldeneye, and common merganser encountered during project area wildlife censuses21
Figure 4.	Observations of bighorn sheep during roadside surveys, September 1980 - September 198124

LIST OF TABLES

Table 1.	Schedule of September 1980-September 1981 field work, Kootenai Falls wildlife monitoring study.. . . .	2
Table 2.	Summary of weather parameters at Libby, September 1980-1981.. . . .	5
Table 3.	Summary of data collected on amphibian, reptile, and bird species observed on the Kootenai Falls study area, January 1978-August 1981.. . . .	7
Table 4.	Summary of data collected on general habitat use and local distribution of mammals observed on the Kootenai Falls study area, January 1978-August 1981.. . . .	15
Table 5.	Results of project area wildlife censuses, September 1980-August 1981.. . . .	17
Table 6.	Bald eagle observations made during the monitoring study in the Kootenai Falls area, September 1980-September 1981..	18
Table 7.	Harlequin duck observations in the Kootenai Falls area, September 1980-August 1981.. . . .	22
Table 8.	Results of bighorn sheep roadside surveys, Kootenai Falls study area, 1981.. . . .	23
Table 9.	Kootenai Falls small mammal trapping results, August 1981.. . . .	26

APPENDICES

A. Habitat Categories	30
B. Area Codes Used for Describing Wildlife Distribution	31

INTRODUCTION

Northern Lights, Inc. (NLI), a rural electric cooperative based in Sandpoint, Idaho, submitted an application to the Montana Department of Natural Resources and Conservation (DNRC) in 1980 to build a hydroelectric dam and generating plant, known as the Kootenai River Hydroelectric Project, in the Kootenai Falls area of Lincoln County, Montana. In 1978, NLI contracted with DNRC to conduct a baseline wildlife investigation in the project area. The results of that study, completed in September 1979, were published later that year (DNRC 1979).

To keep the wildlife data base current and to determine the nature of year-to-year variations in wildlife use of the project area, NLI contracted with DNRC in October 1979 to monitor wildlife in the study area (see DNRC 1979 for a study plan). This study would provide a data base for documenting project-related impacts and determining the success of mitigation and compensation programs, should the Board of Natural Resources and Conservation issue a certificate for the project at the Kootenai Falls site.

The first annual report (DNRC 1981) documented results from the first year of the Kootenai Falls wildlife monitoring study (September 2, 1979, through September 1, 1980). The area monitored in that study was the same as the area inventoried during the original baseline study (DNRC 1979, pp. 2-3), although some surveys were also conducted along U.S. Highway 2 between Libby and Troy.

This second annual report highlights results from the second year of the Kootenai Falls wildlife monitoring study (September 1, 1980 through August 31, 1981). The area investigated during this monitoring period was basically the same as that studied during the last monitoring period. Some modifications in monitoring study design, as suggested in the first annual report (DNRC 1981) were employed this year.

METHODS

Field techniques and analytical methods used in this study were as described in the baseline studies report (DNRC 1979, pp. 109-112) and the first monitoring report (DNRC 1981). Three biologists worked in the study area during the study period (see table 1). A brief summary of methods employed for individual study segments follows.

Table 1. Schedule of September 1980 - September 1981 field work, Kootenai Falls wildlife monitoring study.

Dates	Observer(s)(1)	Type of Field Work
October 14-19, 1980	PN	Riparian wildlife census, bighorn sheep count.
January 7-9, 1981	PN	Riparian wildlife census, bald eagle survey, bighorn sheep counts.
April 3-7, 24, 1981	LT, SK	Riparian wildlife census, bighorn sheep tracking, bighorn sheep count, amphibian and reptile search, census of Yaak Falls.
June 2, 12-16, 1981	LT, SK	Riparian wildlife census, harlequin duck survey, bighorn sheep count, amphibian and reptile search.
July 31 & August 2-5, 1981	PN	Riparian wildlife census, harlequin duck survey, bighorn sheep counts, amphibian and reptile search, small mammal trapping.

(1)

PN = Pat Nichols

LT = Larry Thompson

SK = Stacy Kiser

Species List Update

The species lists presented in the baseline report (DNRC 1979) were updated.

Project Area Wildlife Census

This census was designed to collect data that would allow comparing wildlife use of the project area between months and between years. The methods used were patterned after the standard winter bird study (Kolb 1965) and breeding bird census techniques (Hall 1964, Van Velzen 1972) used in the original inventory, but were expanded to include all vertebrate species. The

area censused included: the entire Kootenai River and its shorelines from 50 m (164 ft) below the proposed dam outlet to the upper end of the proposed reservoir; the land that would be inundated by the dam at a forebay elevation of 610m (2,000 ft); the land that would be affected by railroad relocation; and all remaining land between U.S. Highway 2 and the Kootenai River (see Appendix B). The entire area was censused for three consecutive days during each month of October 1980, and January, April, June, and August 1981, following the instructions outlined in the baseline report (DNRC 1979, appendix F).

Bald Eagle Survey

The Kootenai River between Libby and Troy was surveyed for bald eagles on January 7, 8, and 9, 1981 (1 count each day) following the methods of Meyer (1979). Surveys were made from U.S. Highway 2. Bald eagles seen during project area wildlife censuses and other monitoring field work also were recorded.

Harlequin Duck Special Studies

In addition to surveys made during project area wildlife censuses, special searches of the Kootenai Falls area for harlequin ducks were conducted each study day in June and August. In June, emphasis was placed on determining the total harlequin duck population and the number of pairs present in the project area; in August, emphasis was placed on locating broods.

Bighorn Sheep Studies

During the study period, several different methods were used to gather information on bighorn sheep, as described below.

Bighorn sheep were observed from strategic viewpoints along U.S. Highway 2 during each of the five survey field trips (table 1). In October and January, the cliffs north of the Kootenai River between Libby and Troy were surveyed with a spotting scope. Beginning in April, this method was modified to include only the project area and the area within one mile (upstream) of the project area. Researchers also followed a more controlled observation schedule. These changes were suggested in the first annual report (DNRC 1981). During each survey, the north bank of the river was searched for 10 minutes from each of 10 observation points along U.S. Highway 2. Six such surveys were performed in April, three in June, and three in August. Observations of bighorn sheep made during these surveys, as well as those made in conjunction with other field work, were recorded on maps and standard data sheets. Observations of deer were also recorded. In April, the Sheppard Meadows (DNRC 1981) were searched for tracks or other evidence of bighorn sheep use.

Amphibian and Reptile Search

During April, June, and August, at least four hours each month were spent searching likely habitat in the project area for amphibians and reptiles.

Small Mammal Trapping

Two snap-trap lines (each consisting of 25 stations with two traps per station) were run for three consecutive nights (August 2-4, 1981), one in riparian cottonwoods at the head of Kootenai Falls, and the other in adjacent riparian grassland. Capture data were recorded on standard data sheets.

Census of Yaak Falls

The census of Yaak Falls (DNRC 1981) was discontinued because prior observations indicated that the site is unsuitable as a control or compensation area.

WEATHER

Table 2 summarizes weather data collected at the NOAA Libby recording station (Libby 1 NE Ranger Station) for the period September 1980 to July 1981. The data show that the winter of 1980-81 was exceptionally mild. Average monthly temperatures were 2.3 to 9.6 degrees Fahrenheit (averaging 4.9 degrees) above normal from November through March, and precipitation averaged 1 inch below normal. Snowfall, which totalled only 21.5 inches over the winter, occurred only during the period November through February. Although data on average snowfall at this recording station are not available, snowfall during the same period the previous year, November 1979 through February 1980, totalled 39.6 inches. Snow depths in 1980-81 were relatively low; the greatest depth, 10 inches, was recorded in December 1980. During the winter of 1979-80, the maximum snow depth of 13 inches occurred in January.

Table 2. Summary of weather parameters at Libby, September 1980-July 1981.

Month	Temperature(1) (degrees Fahrenheit)	Precipitation(1) (inches)	Snowfall (inches)	Maximum Snow Depth on Ground (inches)
September 1980	56.9(+0.1)	1.9(+0.6)	0	0
October 1980	45.7(+0.2)	0.7(-1.3)	0	0
November 1980	35.5(+2.3)	1.9(-0.5)	1.5	1
December 1980	30.3(+4.6)	4.1(+1.8)	15.9	10
January 1981	32.0(+9.6)	1.0(-1.4)	0.8	1
February 1981	33.1(+3.0)	1.7(+0.1)	3.3	3
March 1981	40.9(+5.2)	0.3(-1.0)	0	0
April 1981	46.3(+1.0)	1.7(+0.6)	0	0
May 1981	54.4(+0.4)	3.5(+1.9)	0	0
June 1981	56.6(-3.7)	3.4(+1.5)	0	0
July 1981	65.5(-1.5)	1.2(+0.5)	0	0

(1)

Monthly average (departure from normal)

RESULTS AND DISCUSSION

Species List Update

During this monitoring period, 56 species of vertebrates were observed or trapped--45 birds, 10 mammals, and one amphibian. These included 2 new species--the canyon wren and veery. These new species bring the total number of species observed since the studies began in 1978 to 116 (1 amphibian, 1 reptile, 86 birds, and 28 mammals). Data on these species are summarized in tables 3 and 4.

Project Area Wildlife Census

Results of the wildlife censuses conducted in the project area during the study period are summarized in table 5.

Table 3. Summary of data collected on amphibian, reptile, and bird species observed on the Kootenai Falls study area, January through August, 1981

Species	Habitat ¹	Where Observed ²	Status and Abundance ³													
			This Study	Skaar ⁴ (1980)	J	F	M	A	M	J	J	A	S	O	N	D
<u>AMPHIBIANS</u>																
Coeur d'Alene Salamander	R0	22	NA	NA	-	-	-	-	-	-	-	-	-	-	-	-
Plethodon vandykei																
<u>REPTILES</u>																
Garter Snake	GB	P, 20	NA	NA	-	-	-	-	-	-	J	-	-	-	-	-
Thamnophis spp.																
<u>BIRDS</u>																
Great Blue Heron	GB, SW, ER	C, D, F, J, H, L, M, N, O, P, Q	S-U	BW	J	-	-	-	M	J	J	A	-	0	-	-
Ardea herodias																
Canada Goose	SW, GB, RG	C, D, E, M, N, W-C	B-C	W	J	F	M	A	M	J	-	A	-	-	-	-
Branta canadensis																
Mallard	SW, FW, GB, FA, ER, AV, CM	D, F, H, L, M, N, O, P, Q, R, S, T	W-A, B-A	BW	J	F	M	A	M	J	J	-	S	-	N	-
Anas platyrhynchos																
Gadwall	GB, SW	0	fm-U	b	-	-	-	-	-	-	-	-	0	-	-	-
Anas strepera																
Green-winged Teal	GB, SW	0	sm-U	BW	-	-	-	A	-	-	-	-	-	-	-	-
Anas crecca																
Blue-winged Teal	GB, SW	M, O	s-R	B	-	-	-	-	-	J	-	-	-	-	-	-
Anas discors																
American Wigeon	SW, GB	M	sm-R	B	-	-	-	A	M	-	-	-	-	-	-	-
Anas americana																
Common Goldeneye	SW, ER, FW, GB, FA	E, F, H, M, N, O, P, Q, R, S, T	W-A, b-A	BW	J	F	M	A	M	J	-	-	-	-	-	-
Bucephala clangula																
Barrow's Goldeneye	SW, ER	M	b-U	BW	-	-	-	A	M	-	-	-	-	-	-	-
Bucephala islandica																
Bufflehead	SW, AV	M	s-R	BW	-	-	-	-	-	-	-	A	-	-	-	-
Bucephala albeola																
Harlequin Duck	FA, FW, ER, BR, SW	F, G, H, J, L, M, N	B-J	b	-	-	-	A	M	J	J	A	-	0	-	-
Histrionicus histrionicus																
Hooded Merganser	SW	N, O, P	W-R	BW	J	-	-	-	-	-	-	-	-	-	-	-
Lophodytes cucullatus																

Table 3. (continued)

Species	Habitat ¹	Where Observed ²	Status and Abundance ³												
			This Study	Skaar ⁴ (1980)	J	F	M	A	M	J	J	A	S	O	N
Common Merganser <u>Mergus mergamser</u>	FW,GB,SW,AV,ER	D,F,G,H,M,N,O,P, Q,R,S	W-U,B-A	BW	J	F	M	A	M	J	J	-	S	O	N
Red-tailed Hawk <u>Buteo jamaicensis</u>	PD,OA	2,4,8	W-R,S-U	B	-	F	-	-	-	J	-	-	-	0	-
Golden Eagle <u>Aquila chrysaetos</u>	PD	6,20	S-R	BW	-	-	-	A	-	-	-	-	-	-	-
Bald Eagle <u>Haliaeetus leucocephalus</u>	SD,RC,DS,SC,CC,PD,OA	B,D,E,F,H,M,V 8,9,13,21	W-U,S-U	BW	J	F	M	-	-	J	J	-	-	0	N
Osprey <u>Pandion haliaetus</u>	OA,SW,FW,SD,CC	O,E,M,N,O,P,Q 7,19,20,21,22,24	b-C	B	-	-	M	A	M	J	J	A	S	-	-
Merlin <u>Falco columbarius</u>	RD,DS	22	W-U,b-U	BW	J	-	-	-	-	J	-	-	-	-	-
American Kestrel <u>Falco sparverius</u>	SC,RD,CC,DS,SD	21,22	B-U	BW	-	-	-	-	M	J	J	-	-	-	-
Ruffed Grouse <u>Bonasa umbellus</u>	DW,DS	8,18,21,22,23	b-U,w-U	BW	-	F	-	A	M	J	-	-	-	0	-
Killdeer <u>Charadrius vociferus</u>	GB	O,P,25	B-U	BW	J	-	-	A	M	-	-	-	-	-	-
Spotted Sandpiper <u>Actitis macularia</u>	GB,ER,FA	F,J,K,L,M,N,O	b-C	B	-	-	-	-	M	J	J	-	-	-	-
California Gull <u>Larus californicus</u>	SW,OA	M	S-U	-	-	-	-	-	-	J	J	-	-	-	-
Ring-billed Gull <u>Larus delawarensis</u>	SW,OA,ER	I,L	t-U,fn-R	tw	-	-	-	-	-	-	J	-	-	0	-

Table 3. (continued)

Species	Habitat ¹	Where Observed ²	Status and Abundance ³															
			This Study	Skaar ⁴ (1980)	J	F	M	A	M	J	J	A	S	O	N	D		
Mourning Dove <u>Zenaidura macroura</u>	RR,DS	21,20	w-R,b-U	bw	-	F	-	-	M	J	-	-	-	-	-	-	-	-
Common Nighthawk <u>Chordeiles minor</u>	FA	L	s-U	B	-	-	-	-	-	-	J	A	-	-	-	-	-	-
Black Swift <u>Cypseloides niger</u>	OA	L	s-R	b	-	-	-	-	-	-	J	A	-	-	-	-	-	-
Vaux's Swift <u>Chaetura vauxi</u>	OA	L,M	sm-U	b	-	-	-	-	M	-	-	-	-	-	-	-	-	-
White-throated Swift <u>Aeronautes saxatilis</u>	OA	M	s-R	b	-	-	-	-	-	-	-	A	-	-	-	-	-	-
Calliope Hummingbird <u>Stellula calliope</u>	PR,RR,RO,DS	22	s-r	B	-	-	-	-	-	-	J	-	-	-	-	-	-	-
Rufous Hummingbird <u>Selasphorus rufus</u>	DS	21	s-U	B	-	-	-	-	M	J	-	-	-	-	-	-	-	-
Belted Kingfisher <u>Megasceryle alcyon</u>	SW	0,N	w-R,s-U	BW	-	F	-	-	M	-	J	-	-	-	-	-	-	-
Common Flicker <u>Colaptes auratus</u>	RC,CC,SD,DW,DN	21	B-U	BW	-	-	-	-	A	M	J	-	-	0	-	-	-	-
Pileated Woodpecker <u>Dryocopus pileatus</u>	DW	18,22	w-R,s-R	bW	J	-	-	-	A	-	J	-	-	-	-	-	-	-
Hairy Woodpecker <u>Picoides villosus</u>	DW,RC,CC,SD	18,21	w-R,s-R	BW	J	-	-	-	M	-	-	-	-	-	-	-	-	-
Downy Woodpecker <u>Picoides pubescens</u>	RR	21	t-R	b-W	-	-	-	-	-	-	-	-	-	0	-	-	-	-
Willow Flycatcher <u>Empidonax traillii</u>	WI,BA	10,21	b-U	b	-	-	-	-	M	J	-	-	-	-	-	-	-	-

Table 3. (continued)

Species	Habitat ¹	Where Observed ²	Status and Abundance ³												
			This Study	Skaar ⁴ (1980)	J	F	M	A	M	J	J	A	S	O	N
Flycatcher (sp. undeterm.)	DW,AD,DS,DN	17,19,21,22	b-U		-	-	-	-	M	J	-	-	-	-	-
<u>Empidonax</u> sp.															
Violet-green Swallow	OA,PR,BR	F,G,H,I,J,K,L,M, 21	b-A	B	-	-	-	A	M	J	-	-	-	-	-
<u>Tachycineta thalassina</u>															
Tree Swallow	OA,SD	L,M,21	B-U	B	-	-	-	-	M	J	-	-	-	-	-
<u>Iridoprocne bicolor</u>															
Rough-winged Swallow	OA,BR	F,G	B-U	B	-	-	-	-	M	J	-	-	-	-	-
<u>Stelgidopteryx ruficollis</u>															
Barn Swallow	OA,PR	21	b-R	B	-	-	-	-	-	J	-	-	-	-	-
<u>Hirundo rustica</u>															
Steller's Jay	DW	22	fm-R	bW	-	-	-	-	-	-	-	-	0	-	-
<u>Cyanocitta stelleria</u>															
Common Raven	DW,PD,R0,DS,DN,OA, RC,CC	M,8,10,26,25,22, 21,20	W-C,B-C	BW	J	-	-	A	M	J	-	-	0	-	-
<u>Corvus corax</u>															
Common Crow	DW,PD,DS,DN,OA,ER, RC,CC	L,8,17,18,19,20, 21,22,23,24	W-A,b-A	b	J	F	M	A	M	J	J	A	-	0	-
<u>Corvus brachyrhynchos</u>															
Black capped Chickadee	DW,DS,CC,BA,SD,DN	19,20,21,22,23,24	W-A,B-A	BW	J	F	M	A	M	J	J	A	-	0	-
<u>Parus atricapillus</u>															
Mountain Chickadee	DW	22	fm-R	BW	-	-	-	-	-	-	-	-	0	-	-
<u>Parus gambeli</u>															
Chestnut-backed Chickadee	DS	21	w-U	bW	J	-	-	-	-	-	-	-	-	-	-
<u>Parus rufescens</u>															
Red-breasted Nuthatch	DW,DS	22	w-R,s-R	BW	-	-	M	-	-	J	-	-	0	-	-
<u>Sitta canadensis</u>															
Brown Creeper	DW	22	w-R	BW	-	F	-	-	-	-	-	-	-	-	-
<u>Certhia familiaris</u>															

Table 3. (continued)

Species	Habitat ¹	Where Observed ²	Status and Abundances ³											
			This Study	W-C, D-C	BW	J	F	M	A	M	J	J	A	S O N D
Dipper <u>Cinclus mexicanus</u>	RA, FA, ER, GB, FW	F, H, I, J, L, P, Q, 21			BW									
Canyon Wren <u>Catherpes mexicanus</u>	DN	9		b-U	-	-	-	-	-	-	J	-	-	-
Winter Wren <u>Troglodytes troglodytes</u>	DW	22		s-R	BW	-	-	-	-	M	J	-	-	-
Gray Catbird <u>Dumetella carolinensis</u>	BA, AD	19, 21		b-U	B	-	-	-	-	-	J	-	-	-
American Robin <u>Turdus migratorius</u>	DW, DS, CC, RC, PD, DN, BA, BR, OA	I, N, S, 8, 13, 20, 21, 22		b-C	BW	-	-	M	A	M	J	J	A	-
Varied Thrush <u>Ixoreus naevius</u>	DW, DN	8, 20, 21, 22		b-c	BW	-	-	M	A	M	-	-	-	-
Swainson's Thrush <u>Catharus ustulatus</u>	DS, DW, DN	3, 4, 13, 20, 21, 22		B-C	B	-	-	-	M	J	J	-	-	-
Veery <u>Catharus fuscens</u>		21		b-R	b	-	-	-	-	-	-	A	-	-
Mountain Bluebird <u>Sialia currucoides</u>	RO, BR	22, J		t-U	B	-	-	-	A	-	J	-	-	0
Towheesend's Solitaire <u>Myadestes townsendi</u>	PD, RO	4, 21		w-U, s-U	BW	-	-	M	-	-	J	-	-	0
Golden-crowned Kinglet <u>Regulus satrapa</u>	DW	3, 4, 17, 18, 20, 21, 22, 23, 24, 25		W-A, b-A	BW	J	F	M	A	M	J	J	-	0
Ruby-crowned Kinglet <u>Regulus calendula</u>	DW, CC	21		b-U	B	-	-	-	-	M	-	-	-	-
Cedar Waxwing <u>Bombus cillia cedrorum</u>	DS, PD, BA	20, 22		s-U	BW	-	-	-	-	-	J	-	-	-
Northern Shrike <u>Lanius excubitor</u>	CC	19		w-R	tW	J	-	-	-	-	-	-	-	-

Table 3. (continued)

Species	Habitat ¹	Where Observed ²	Status and Abundance ³											
			This Study	Skaar ⁴ (1980)	J	F	M	A	M	J	J	A	S	O
					N	B	R	R	Y	N	L	G	P	T
Red-eyed Vireo <i>Vireo olivaceus</i>	DS,DW,DN,BA	9,20,21	b-U	B	-	-	-	-	-	J	-	-	-	-
Warbling Vireo <i>Vireo gilvus</i>	AD,CC,RR,DW,BA	21,22	b-U	B	-	-	-	-	-	J	-	-	-	-
Orange-crowned Warbler <i>Vermivora celata</i>	BA,CC,PR,DS	22	b-R	b	-	-	-	-	-	J	-	-	-	-
Nashville Warbler <i>Vermivora ruficapilla</i>	BA,CC,DS	20,21,22	b-C	B	-	-	-	-	M	J	-	-	-	-
Yellow Warbler <i>Dendroica petechia</i>	DS,WI,BA,CC	20,21,22,23	b-U	B	-	-	-	A	M	J	-	-	-	-
Yellow-rumped Warbler <i>Dendroica coronata</i>	DW,DS,CC,DW	3,4,5,20,21,22	b-A	B	-	-	-	A	M	J	-	-	-	-
Townsend's Warbler <i>Dendroica townsendi</i>	DW	21,22	b-U	B	-	-	-	-	-	J	-	-	-	-
MacGillivray's Warbler <i>Upornornis tolmiei</i>	DW,RR,BA,CC	18,20,21,22	b-C	B	-	-	-	A	M	J	-	-	-	-
American Redstart <i>Setophaga ruticilla</i>	BA,DW,CC	22	b-U	B	-	-	-	-	-	J	-	-	-	-
Western Meadowlark <i>Sturnella neglecta</i>	RG	21	t-R	BW	-	-	-	-	-	-	-	-	0	-
Brown-headed Cowbird <i>Molothrus ater</i>	PR,ER,DS,CC	L,M,20,21	b-C	B	-	-	-	-	M	J	-	-	-	-
Western Tanager <i>Piranga ludoviciana</i>	DW,DN,DS,PR,CC	20,21,22	b-U	B	-	-	-	-	-	J	-	-	-	-
Lazuli Bunting <i>Passerina amoena</i>	CC,DW,DS	21	s-R	b	-	-	-	-	-	J	-	-	-	-

Table 3. (continued)

Species	Habitat ¹	Where Observed ²	Status and Abundance ³											
			This Study	Skar ⁴ (1979)	J	F	M	A	M	J	J	A	S	O N 0
Pine Siskin <u>Carduelis pinus</u>	PD,DW,DN,CC	20,21	B-C	bW	-	-	-	-	A	M	J	-	-	-
American Goldfinch <u>Carduelis tristis</u>	CC, RG, DS, DA	M	s-R	bW	-	-	-	-	-	J	-	-	-	-
Red Crossbill <u>Loxia curvirostra</u>	DS,DW,CC,DN	19	B-C	bW	-	-	-	-	-	J	-	-	S 0	-
Rufous-sided Towhee <u>Pipilo erythrophthalmus</u>	BA	21	b-U	bW	-	-	-	A	-	-	-	-	-	-
Dark-eyed Junco <u>Junco hyemalis</u>	DW,DN,PD,DS,CC	3,4,19,20,21,22,23	B-C	BW	-	-	-	-	M	J	-	-	-	-
Chipping Sparrow <u>Spizella passerina</u>	DS,DW,CC,DN	4,19,20,21,22	B-C	B	-	-	-	-	M	J	-	-	-	-
Lincoln's Sparrow <u>Melospiza lincolni</u>	DW,DS	21,22	s-R	b	-	-	-	-	M	-	J	-	-	-
Song Sparrow <u>Melospiza melodia</u>	RR, RG, DS, PR, WI, BA	10,18,19,20,21,22	W-U, B-A	BW	J	F	M	A	M	J	-	-	0 N	-
Snow Bunting <u>Plectrophenax nivalis</u>	PR	21	w-U	wt	J	-	-	-	-	-	-	-	-	-

Table 3. (continued)

Footnotes:

1 Habitat categories abbreviations as in Appendix A.

2 See Appendix B for location codes of river stretches (letters) and upland areas (numbers).

3 Status: W - Overwinters in area (at least one record each during January and February).

w - Transient in winter.

sm - Spring migrant.

fm - Fall migrant.

B - Breeds on area (nest or dependent young located).

b - Probably breeds on area (territorial males or pairs located).

s - Summers on area in small numbers but no evidence of breeding.

t - Occurs but no evidence of breeding.

Abundance: A - Abundant, found in large numbers in appropriate habitats.

C - Common, found in moderate numbers in appropriate habitats, 15 to 50 registrations.

U - Uncommon, small numbers in appropriate habitats, 2 to 15 registrations.

R - Rare, few sightings, 1 or 2 registrations.

4 Indicates status of species in latilong No. 1 as reported by Skaar (1980).

5 Months when seen are indicated by letter abbreviations in sequence, January through December (Note: Very little field work was carried out in August, September, and November; none was carried out in December).

Table 4. Summary of data collected on general habitat use and local distribution of mammals observed on the Kootenai Falls study area, January 1978 - August 1981.

Common Name	Scientific Name	General Habitat Description ¹	Where Observed ²
Masted Shrew	<u>(Sorex cinereus)</u>	Trapped in western red cedar forest (DW)	21
Vagrant Shrew	<u>(Sorex vagrans)</u>	Riparian grassland; Douglas fir and western red cedar forest (RG,DW,DN)	21
Mountain Cottontail	<u>(Sylvilagus nuttallii)</u>	Railroad right-of-way (RR)	21
Snowshoe hare	<u>(Lepus americanus)</u>	Railroad right-of-way (RR)	21
Golden-mantled squirrel	<u>(Spermophilus lateralis)</u>	Open, Douglas-fir/ponderosa pine forest and scree on north side of river (PD,ST)	4
Columbian ground squirrel	<u>(Spermophilus columbianus)</u>	Banks in open areas along railroad tracks; north of river in open Douglas-fir-ninebark forest (RR,RG,DN)	3,4,20,21,22
Red-tailed chipmunk	<u>(Eutamias ruficaudus)</u>	Railroad right-of-way; talus (RR,ST,PD)	21,22,19
Yellow-pine chipmunk	<u>(Eutamias amoenus)</u>	Railroad right-of-way; talus (RR,ST,PD)	21,22,19
Red squirrel	<u>(Tamiasciurus hudsonicus)</u>	Conifers; several middens in Section 21 (DW,DS,DN)	3,4,5,6,20,21,22,23,24
Northern flying squirrel	<u>(Glaucomys sabrinus)</u>	Remains discovered in conifers (DW)	22
Beaver	<u>(Castor canadensis)</u>	Undercut banks along south shore of river falls and observed in calm water below the falls (W1,SW)	M,N,D,E
Northern pocket gopher	<u>(Thomomys talpoides)</u>	Riparian grassland (RG)	
Deer Mouse	<u>(Peromyscus maniculatus)</u>	Coniferous forest, talus (DW,DS,ST,DN)	21
Red-backed vole	<u>(Clethrionomys gapperi)</u>	Western red cedar forest (DW)	21
Meadow vole	<u>(Microtus pennsylvanicus)</u>	Riparian grassland (RG)	21
Long-tailed vole	<u>(Microtus longicaudus)</u>	Riparian grassland and shrubbery (RG,PC)	21

Table 4 (continued)

Common Name	Scientific Name	General Habitat Description ¹	Where Observed ²
Muskrat	<u>(Ondatra zibethica)</u>	Below the falls in calm water (SW)	E
Meadow jumping mouse	<u>(Zapus princeps)</u>	Riparian grassland (RG)	21
Bushy-tailed woodrat	<u>(Neotoma cinerea)</u>	Steep sidehill, large rocks in timber, railroad right-of-way (RO,RR)	22
Mink	<u>(Mustela vison)</u>	Remains discovered on highway 2	21
River otter	<u>(Lutra canadensis)</u>	Dense, deciduous bank vegetation and river (SW,AV,ER)	M-N
Coyote	<u>(Canis latrans)</u>	Conifer forests, deciduous vegetation, meadows, shore (DW,RG,GB)	21
Black Bear	<u>(Ursus americanus)</u>	Trail through dense vegetation leading to river; apparently regularly used	18
White-tailed deer	<u>(Odocoileus virginianus)</u>	Often associated with water and dense brush but also observed in rocky habitats, railroad right-of-way (PD,DS,RR,DW)	5,6,9,13,10
Mule deer	<u>(Odocoileus hemionus)</u>	Often observed on steep timbered hillsides but also occurring on the flood plain (PD,DW)	5,10,12,21
Elk	<u>(Cervus canadensis)</u>	One set of tracks in cedar forest (DW)	21
Moose	<u>(Alces alces)</u>	River floodplain and cedar forest (RC,DW)	17,19
Bighorn sheep	<u>(Ovis canadensis)</u>	Primarily in Douglas-fir habitat types and associated bluffs, broken terrain, cliffs and parks north of the river (RO,DN,DS,RG,PD,ST)	1,2,3,4,5,6,7,8,9, 10,11,12,13

¹ Habitat category abbreviations as in Appendix A.² See Appendix B for location codes of river (letters) and upland (numbers) portions of the study area.

Table 5. Results of project area wildlife censuses, September 1980-August 1981.

Species	Average number known present per trip				
	Oct.	Jan.	Apr.	June	Aug.
<u>BIRDS</u>					
Great Blue Heron	1.0	0.7	-	-	1.3
Canada Goose	1.7	-	3.3	2.0	-
Mallard	1.7	-	27.0	10.3	1.3
Common Goldeneye	0.3	47.3	20.0	-	-
Harlequin Duck	-	-	-	3.7	-
Common Merganser	1.7	1.7	9.3	6.7	5.0
Unidentified Duck	-	0.3	-	-	-
Bald Eagle	0.3	1.7	-	-	-
Osprey	-	-	0.3	1.7	1.0
Killdeer	-	-	1.3	1.0	-
Spotted Sandpiper	-	-	-	12.3	0.7
California Gull	-	-	-	-	2.7
Mourning Dove	-	-	-	1.3	0.3
Black Swift	-	-	-	-	1.3
Unidentified Hummingbird	-	-	-	0.3	-
Belted Kingfisher	-	-	0.3	0.3	1.0
Common Flicker	1.0	-	3.0	1.0	1.0
Downy Woodpecker	0.3	-	-	-	-
Violet-green Swallow	-	-	7.3	N.E. (1	-
Rough-winged Swallow	-	-	-	N.E. (1	-
Common Raven	1.7	0.7	2.0	3.3	0.3
Common Crow	1.0	1.7	14.7	16.3	7.0
Black-capped Chickadee	5.3	2.7	7.3	1.3	1.3
Red-breasted Nuthatch	4.0	0.7	13.0	2.0	0.3
Gray Catbird	-	-	-	-	0.3
Dipper	1.0	3.0	3.0	1.7	1.7
Winter Wren	-	-	0.3	-	-
Canyon Wren	-	-	-	1.0	-
American Robin	-	-	16.3	12.3	-
Varied Thrush	-	-	1.7	2.3	-
Swainson's Thrush	-	-	-	5.3	-
Veery	-	-	-	-	0.3
Townsend's Solitaire	-	-	1.0	0.7	-
Golden-crowned Kinglet	-	0.7	15.7	-	-
Cedar Waxwing	-	-	-	13.7	-
Red-eyed Vireo	-	-	-	0.3	0.3
Unknown Vireo	-	-	-	5.7	-
Yellow Warbler	-	-	-	1.3	0.3
Nashville Warbler	-	-	-	0.3	-
Yellow-rumped Warbler	-	-	-	-	1.0
MacGillivray's Warbler	-	-	-	-	0.3
Unidentified Warbler	-	-	-	-	1.3
Brown-headed Cowbird	-	-	-	2.3	-
Pine Siskin	16.7	3.0	90.2	8.0	3.7
Red Crossbill	-	-	5.7	-	-
Dark-eyed Junco	-	-	5.3	-	-
Song Sparrow	4.0	-	16.7	15.7	2.3
Unidentified Sparrow	-	-	-	-	-

Unidentified Passerine	-	0.3	6.7	25.0	21.7
MAMMALS					
Unidentified Chipmunk	0.3	-	4.7	-	2.3
Tree Squirrel	1.7	0.3	3.0	-	6.3
Bighorn Sheep	-	2.3	-	-	-
Unidentified small mammal	-	-	0.3	0.3	-

1
NE=no estimate made because of large numbers and constant movement

Seasonal variation in numbers of species encountered during project area censuses each month is shown in figure 1. Study data show that the number of water-related bird species (waterfowl, shorebirds, herons, gulls, ospreys, bald eagles, dippers, belted kingfishers) remains relatively constant year-round, with a slight increase during the breeding season. The number of species of other birds is relatively high throughout the year, but increases considerably during the breeding season.

Census results for the dipper are shown in figure 2, and variations in average monthly abundance of the most common waterfowl species, as determined by the censuses, is portrayed in figure 3.

Bald Eagle Survey

During the monitoring study, bald eagles were observed in October 1980, and in January 1981 (table 6). One adult bald eagle was seen during the January 7 bald eagle survey, and two adults were seen during each of the following two surveys (January 8 and 9). This indicates that the degree of use in 1981 was the same as that reported for 1980 (DNRC 1981).

Table 6. Bald eagle observations made during the monitoring study in the Kootenai Falls area, September 1980-September 1981

Date	Observer(1)	Location (River Section)(2)	Minimum Number Known Present
10-17-80	PN	L	1 adult
1-7-81(3)	PN	T	1 adult
1-8-81(3)	PN	Q,T	2 adults
1-9-81(3)	PN	T	2 adults

(1)

PN=Pat Nichols

(2)

Location codes as in Appendix B

(3)

Observations made during bald eagle surveys

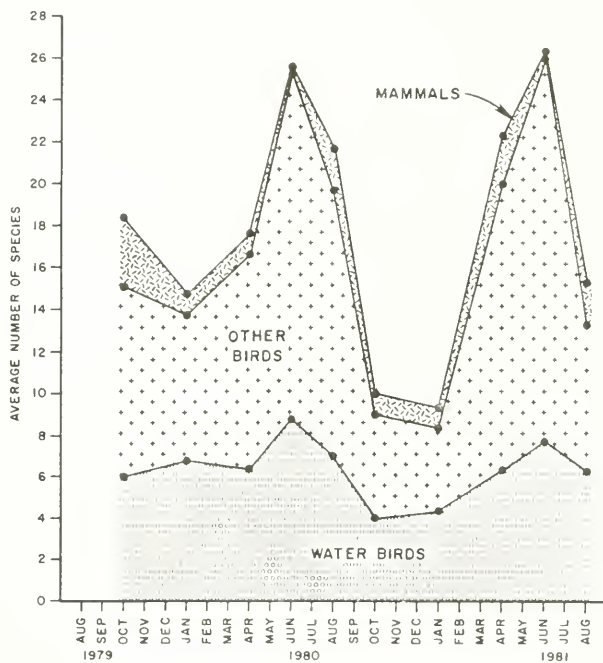
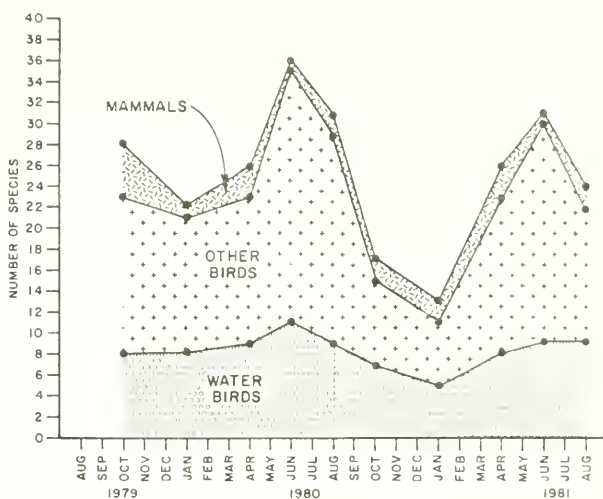


Figure 1. Seasonal variation in total (top) and average (bottom) numbers of species encountered during project area censuses.

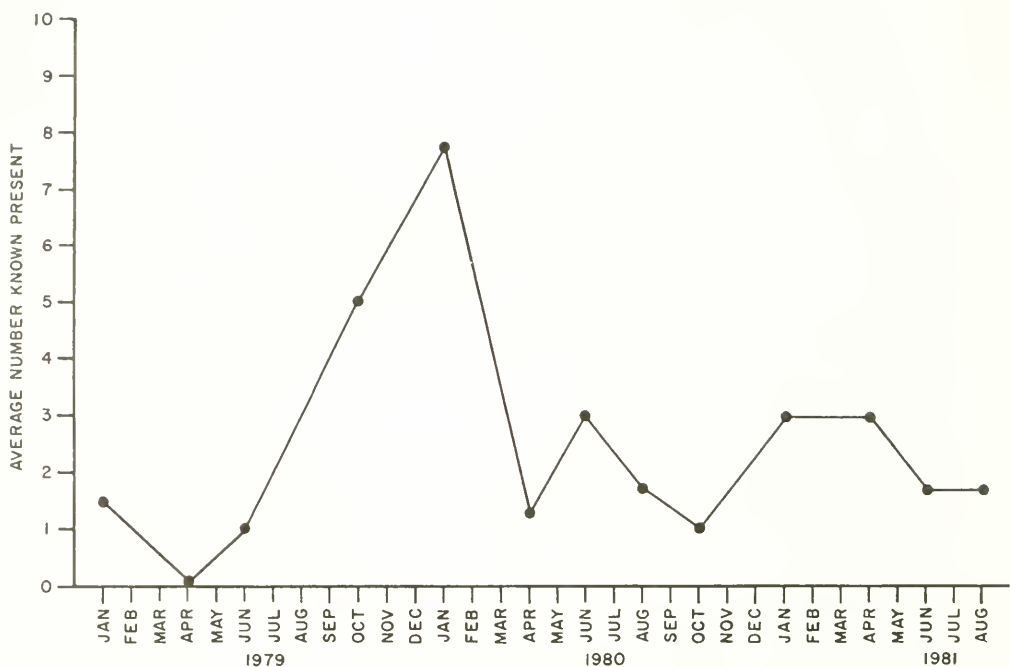


Figure 2. Seasonal variation in average numbers of dippers encountered during project area wildlife censuses.

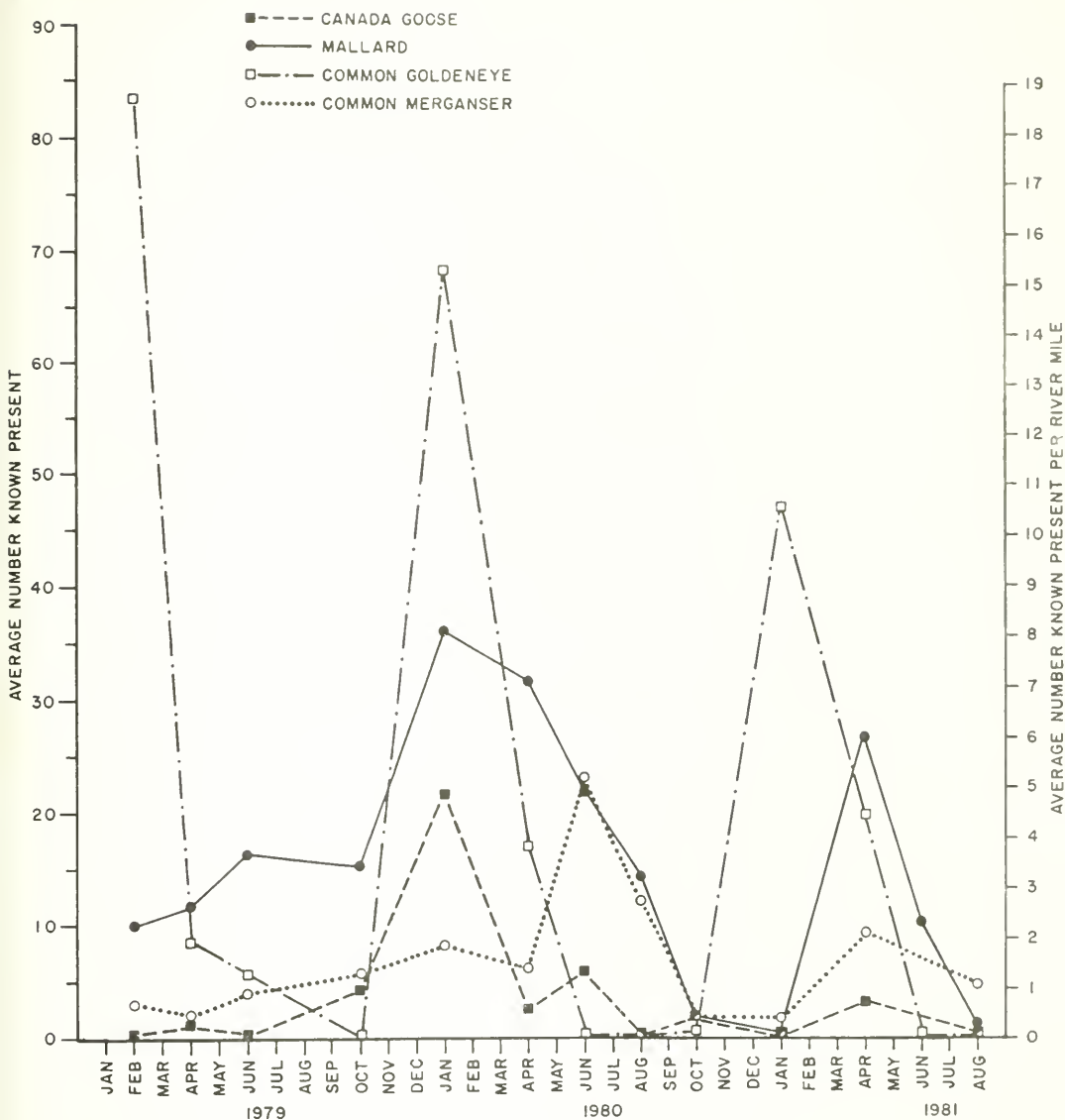


Figure 3. Seasonal variation in average number of Canada goose, mallard, common goldeneye, and common mergansers encountered during project area wildlife censuses.

Harlequin Duck Special Studies

Information on harlequin ducks observed during the monitoring period is presented in table 7. Harlequin ducks were observed only in May and June of 1981. A minimum of 8 ducks (including at least two pairs, 3 possibly unpaired males, and one possibly unpaired female) was known to be present during the study period. During August 1981, searches were made for broods but none were observed. Flows in the river were very high, 20,000 cfs or greater, which might account for the lack of broods in the area. Comparing these data with those obtained in 1980 (DNRC 1981), it appears that use of the falls area by adult harlequins increased considerably in 1981.

Table 7. Harlequin duck observations in the Kootenai Falls area, September 1980-August 1981.

Date	Minimum number known present				Location (River Section)(1)
	Males	Females	Pairs	Total	
May 23, 1981(2)	5	3	1	8	J,L
May 31, 1981(2)	3	3	-	6	L
June 13, 1981(3)	2	2	-	4	L
June 14, 1981(3)	3	2	2	5	L
June 15, 1981(3)	2	2	2	4	L
June 16, 1981(3)	2	2	2	4	L

(1) Abbreviations as defined in Appendix B

(2) Observations by L. Schelvan (USFS)

(3) Observations by S. Kiser

Bighorn Sheep Studies

Locations of bighorn sheep observations recorded during the roadside surveys are shown in figure 4. In October 1980, two groups of sheep were observed on cliffs above the Kilpatrick property. One group consisted of 6 lambs and 7 ewes; the other contained 3 ewes. In January 1981, a group of 6 ewes was observed at the salt lick on the Sheppard property. Table 8 summarizes results of the roadside surveys conducted in April, June, and August, for which different methods than those used for the October and January surveys were employed. In April, at least 40 different sheep were observed. The average number of individual sheep known present during the six April surveys was 26.2; the average number of observations recorded was 35.5. In June, only 6 different sheep were observed, and in August, only 3 were sighted. This decrease in sheep sightings is thought to be due to (1) decreased observability due to leaf-out and use of dense cover by sheep, and (2) summer movement of sheep to somewhat higher elevations, as indicated by other data obtained during the study period. During April visits to the Sheppard meadows, no known bighorn sheep sign was observed.

Table 8. Results of bighorn sheep roadside surveys, Kootenai Falls study area, 1981.

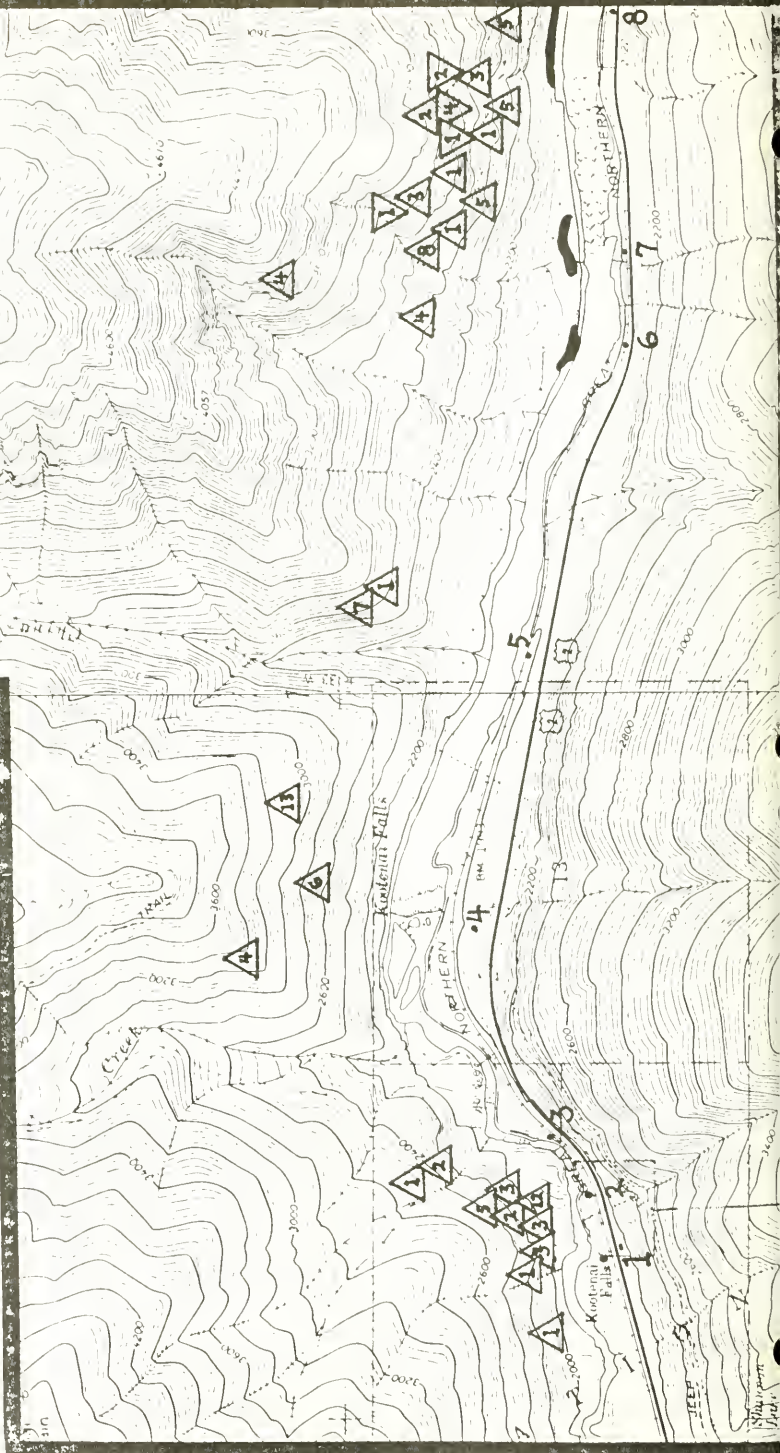
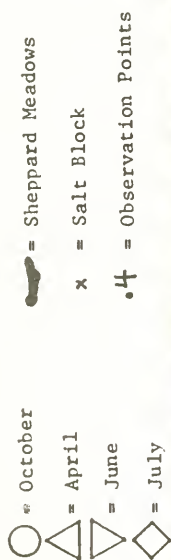
Date	Observer ¹	Starting Time	Starting Station No.	No. Obs. Recorded ²	Min. No. Sheep Known Present			
					Rams	Ewes	Other ³	Total
April 4	LT	1702	10	85	18	22	0	40
April 5	LT	1715	1	34	5	17	6	28
April 7	SK	0618	1	18	7	6	4	17
April 7	SK	1155	1	25	6	8	10	24
April 24	SK	0545	10	28	20	7	1	28
April 24	SK	1210	10	23	5	10	5	20
April Average				35.5	10.2	11.7	4.3	26.2
June 12	SK	0545	1	6	1	0	5	6
June 13	SK	1200	1	2	0	1	1	2
June 13	SK	1945	1	4	0	2	2	4
June Average				4.0	0.3	1.0	2.7	4.0
August 2	PN	0750	1	3	0	2	1	3
August 2	PN	1925	10	0	0	0	0	0
August 4	PN	1421	10	0	0	0	0	0
August Average				1.0	0.0	0.7	0.3	1.0

¹SK=Stacy Kiser, PN=Pat Nichols, LT=Larry Thompson

²Includes multiple observations of the same individuals

³Includes lambs and unclassified sheep

Figure 4. Observations of bighorn sheep during roadside surveys, September 1980-September 1981. (Numbers within symbols indicate group size.)



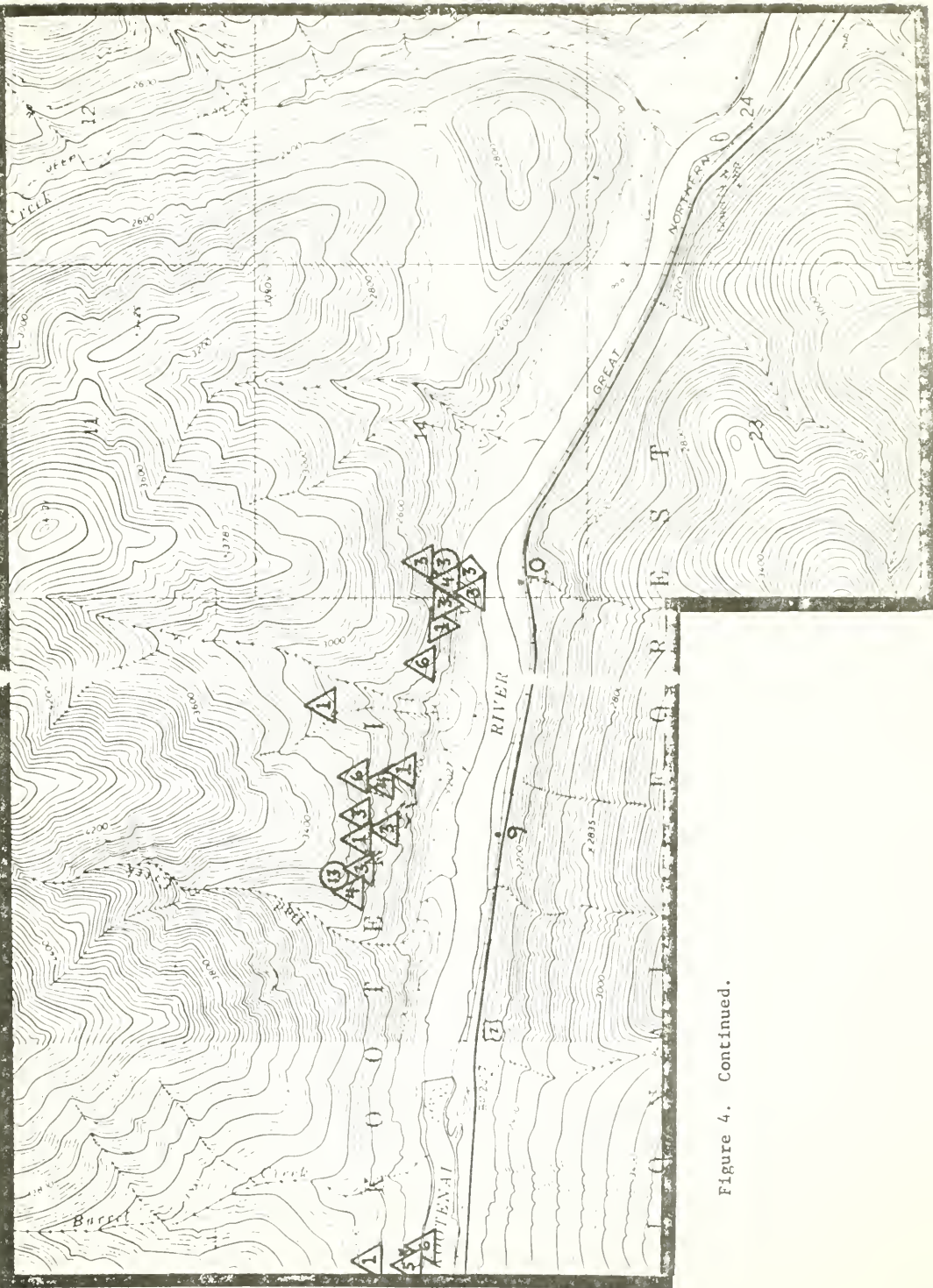


Figure 4. Continued.

Amphibian and Reptile Search

On April 3 and 5, 1981, five different Coeur d'Alene salamanders were observed at two sites in the vicinity of 1980 sightings--under moss on cliffs near the U.S. Highway 2 retaining wall above the proposed tail tunnel outlet. Two specimens, collected in 1980, were deposited with Montana State University in Bozeman.

Small Mammal Trapping

Table 9 presents a summary of the results of 1981 small mammal trapping.

Table 9. Kootenai Falls small mammal trapping results,
August 1981.

	Floodplain Grassland	Riparian Trees and Shrubs	Total 1981
Total number of captures	25	15	40
Total number of species	3	4	6
Total biomass (grams)	577	311	888
Captures per species:			
Masked Shrew (<u>Sorex cinereus</u>)	--	1	1
Yellow pine Chipmunk (<u>Eutamias amoenus</u>)	3	--	3
Deer Mouse (<u>Peromyscus maniculatus</u>)	21	12	33
Long-tailed Vole (<u>Microtus longicaudus</u>)	1	--	1
Meadow Jumping Mouse (<u>Zapus princeps</u>)	--	1	1
Flying Squirrel (<u>Glaucomys sabrinus</u>)	--	1	1

RECOMMENDATIONS FOR FUTURE MONITORING

The monitoring study should be continued as modified (DNRC 1981), and work should continue toward selection of a suitable control area. Preliminary study indicates that the section of the Kootenai River below Troy, as well as that part of the river between Libby and the proposed Libby Reregulation Project site, may be the best potential control areas, although they are by no means ideal. During the winter and spring 1982 monitoring studies, an effort should be made to investigate bighorn sheep use of the Sheppard property. This will be especially important if the winter of 1981-82 is more severe than 1980-81. The monitoring contract should be amended to include a late February-early March field trip to further investigate the use of the Sheppard property by bighorn sheep.

ACKNOWLEDGMENTS

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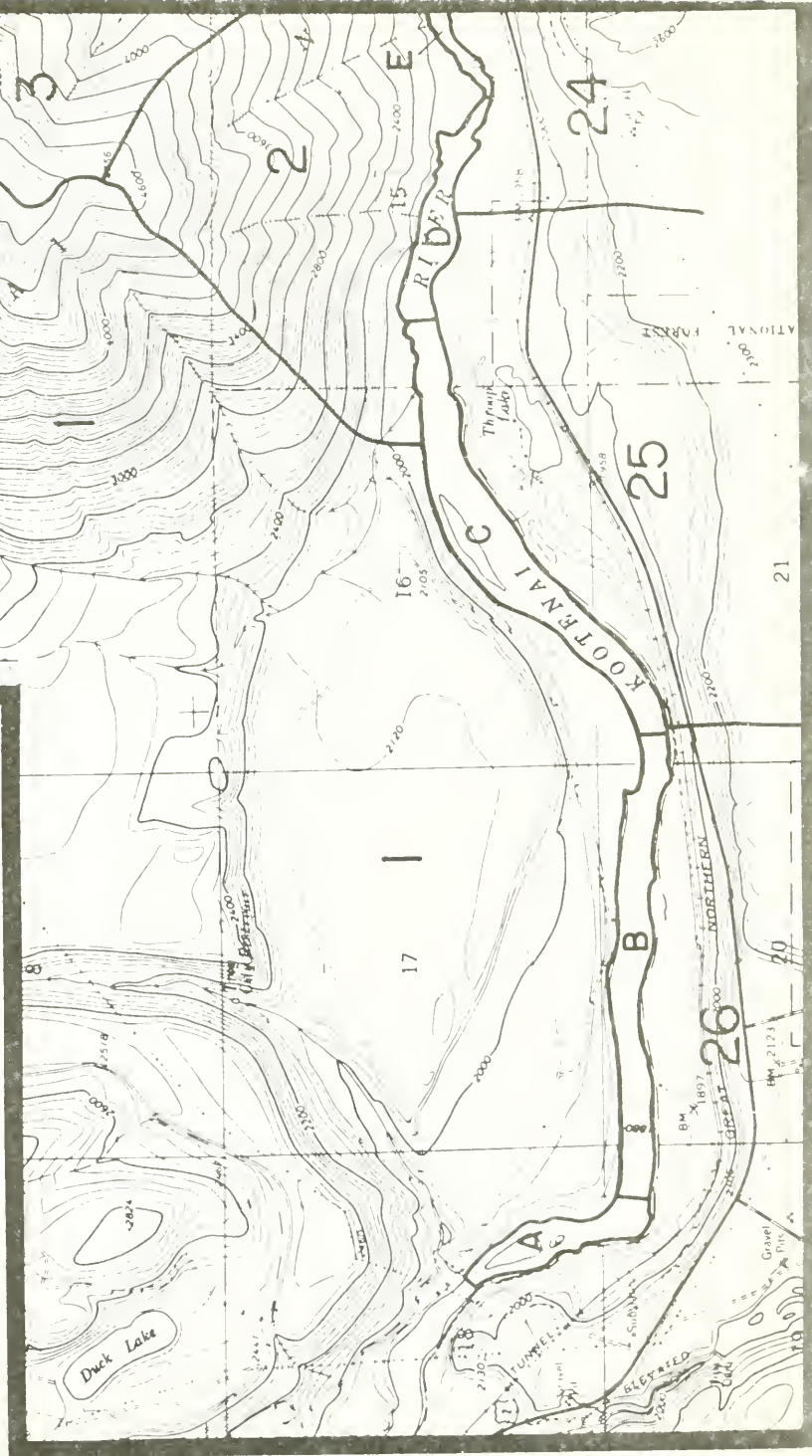
Appendix A. Habitat categories.

Habitat Category	Abbr.	Component Community Types ¹	Dominant Vegetation
<u>WATER HABITATS</u>			
Rapids	RA	-	None--includes fast water broken by shallow rocks
Falls	FA	-	None--includes fast water falling over falls, fast water above and below falls
Slow Water	SW	-	None--includes relatively smooth, wide river sections, mostly upstream of falls, with no white water
Fast Water	FW	-	None--includes narrowly constructed sections of river, mostly below falls having no white water
Aquatic Vegetation (rooted)	AV	17	<u>Panunculus aquatilis</u> , <u>Elodea canadensis</u>
<u>SPARSELY VEGETATED HABITATS</u>			
Exposed Rock or Logjams (in River)	ER	R	None--includes exposed rock in river surrounded by water as well as logjams
Bare Rock (Upland)	BR	R	None--includes scoured rock along river canyon not surrounded by water
Gravel Bar	GB	12	<u>Tanacetum vulgare</u> , <u>Agrostis alba</u> , <u>Equisetum arvense</u>
Scree and Talus	ST	S	None--includes steep rockslides adjacent to river
Rocky Outcrops (Upland)	RO	15	<u>Festuca scabrella</u> , <u>Physocarpus malvaceus</u> , <u>Philadelphus lewisii</u>
<u>GRASSLAND AND MARSH HABITATS</u>			
Riparian Grassland and Hayfields	RC	14, 20, 25	<u>Phleum pratense</u> , <u>Poa pratensis</u> , <u>Bromus inermis</u> , <u>Agropyron repens</u>
Fescue Grassland	FC	16	<u>Festuca scabrella</u> , <u>Agropyron spicatum</u> , <u>Balsamorhiza sagittata</u>
Cattail Marsh	CM	13	<u>Typha latifolia</u>
<u>SHRUB HABITATS</u>			
Willow	WI	24	<u>Salix</u> spp., <u>Tanacetum vulgare</u> , <u>Agrostis alba</u>
Birch-Alder-Dogwood	BA	21	<u>Betula occidentalis</u> , <u>Alnus incana</u> , <u>Cornus stolonifera</u>
Alder-Dogwood	AD	11	<u>Alnus incana</u> , <u>Cornus stolonifera</u>
<u>FOREST HABITATS</u>			
Riparian Cottonwoods ²	RC	10	<u>Populus trichocarpa</u> , <u>Alnus incana</u> , <u>Betula occidentalis</u>
Snags (Deciduous)	SD	10, 9, 23	<u>Populus trichocarpa</u> (usually)
Cottonwood-Conifers ³	CC	9, 23	<u>Populus trichocarpa</u> , <u>Pseudotsuga menziesii</u> , <u>Thuja plicata</u>
Ponderosa Pine-Douglas Fir ⁴	PD	4, 5	<u>Pinus ponderosa</u> , <u>Pseudotsuga menziesii</u>
Douglas Fir/Shrub ³	DS	6, 8	<u>Pseudotsuga menziesii</u> , <u>Pinus ponderosa</u> , <u>Calamagrostis rubescens</u>
Douglas Fir/Ninebark ⁴	DN	2, 3	<u>Pseudotsuga menziesii</u> , <u>Physocarpus malvaceus</u>
Douglas Fir-Western Red Cedar	DW	1, 7	<u>Pseudotsuga menziesii</u> , <u>Thuja plicata</u>
Snags (Coniferous)	SC	1-9, 23	Variable
<u>OTHER</u>			
Powerline Right-of-way	PR	18	<u>Betula occidentalis</u> , <u>Rubus parviflorus</u> , <u>Acer glabrum</u>
Railroad Right-of-way	RR	19	<u>Berberis repens</u> , <u>Rubus parviflorus</u> , <u>Sambucus cerulea</u>
Orchard	OR	22	<u>Pyrus malus</u>
Open Air	OA	-	None--includes open air of river canyon

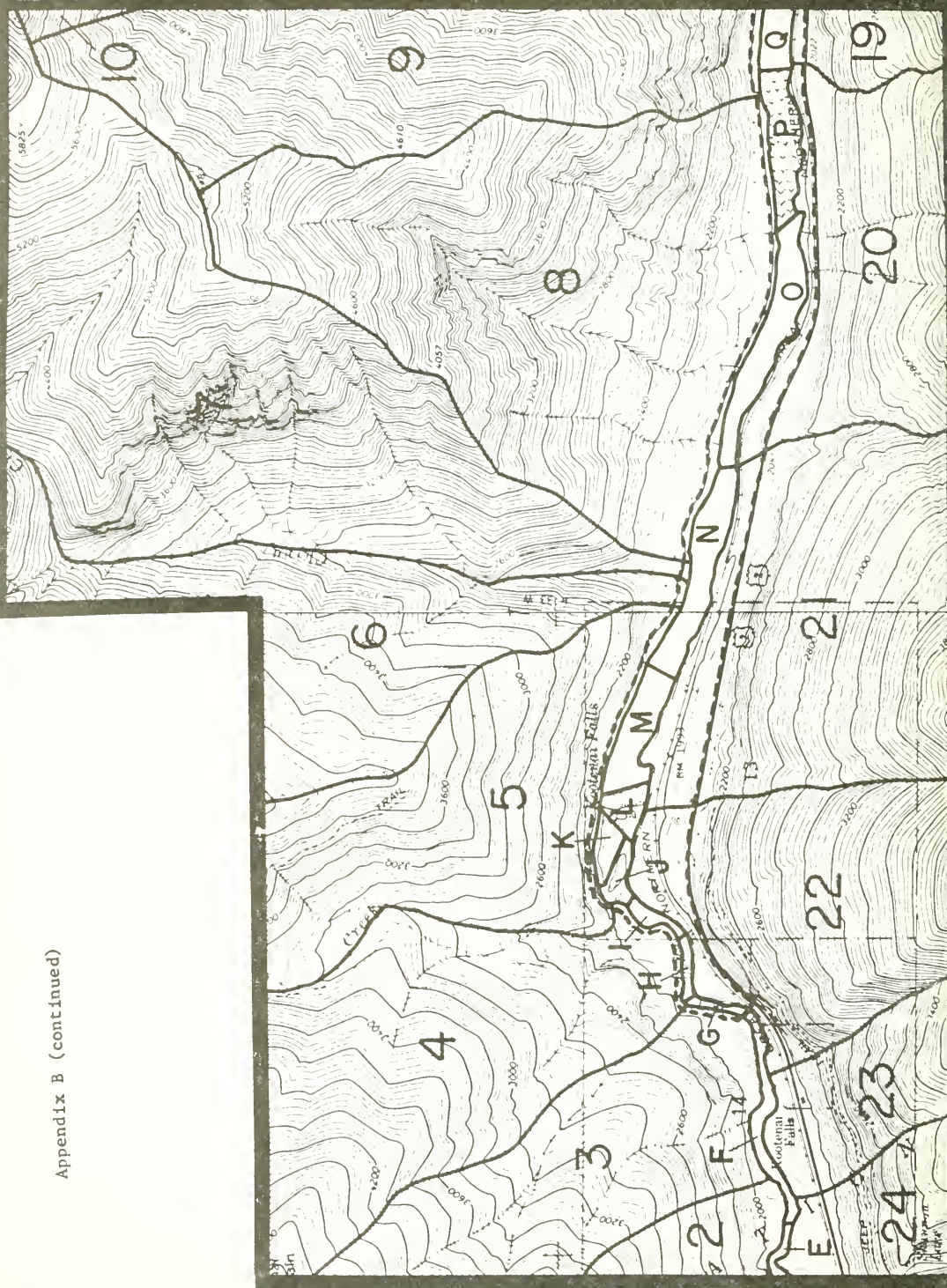
¹See DNRC 1979²Early Succession³Mid Succession⁴Late Succession

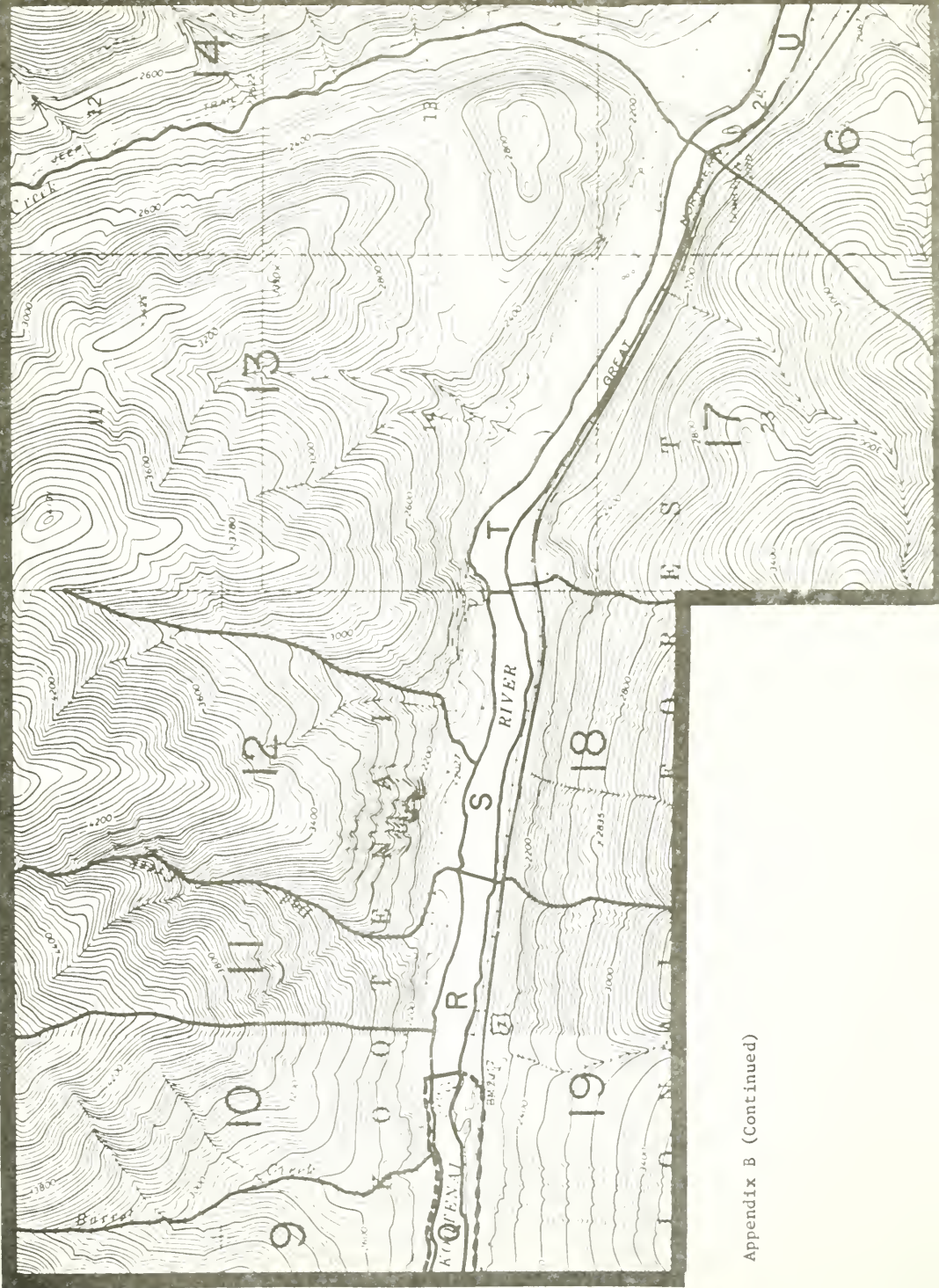
Appendix B. Area codes for describing
wildlife distribution.

----- Project Area Census Boundary



Appendix B (continued)





Appendix B (Continued)

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WILDLIFE
MONITORING STUDY

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First Annual Report
for the period
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TABLE OF CONTENTS

LIST OF FIGURES.....	ii
LIST OF TABLES.....	iii
INTRODUCTION.....	1
METHODS.....	2
Species List Update.....	2
Project Area Wildlife Census.....	2
Bald Eagle Survey.....	4
Harlequin Duck Special Studies.....	4
Bighorn Sheep Survey.....	4
Amphibian and Reptile Search.....	5
Small Mammal Trapping.....	5
Census of Yaak Falls.....	5
Vegetation Analysis--Riparian Tree/Shrub Habitats.....	6
Vegetation Analysis--Sheppard Meadows.....	6
RESULTS AND DISCUSSION.....	9
Species List Update.....	9
Project Area Wildlife Census.....	9
Bald Eagle Survey.....	14
Harlequin Duck Special Studies.....	14
Bighorn Sheep Survey.....	17
Amphibian and Reptile Search.....	21
Small Mammal Trapping.....	21
Census of Yaak Falls.....	21
Vegetation Analysis--Riparian Tree/Shrub Habitats.....	23
Vegetation Analysis--Sheppard Meadows.....	23
RECOMMENDATIONS FOR FUTURE MONITORING.....	33
ACKNOWLEDGMENTS.....	37
LITERATURE CITED.....	38
APPENDIX.....	39

LIST OF FIGURES

Figure 1.	Locations of riparian tree and shrub sampling plots.....	7
Figure 2.	Seasonal variation in average numbers of vertebrate species encountered during project area wildlife censuses.....	13
Figure 3.	Seasonal variation in average numbers of dipper encountered during project area wildlife censuses.....	13
Figure 4.	Seasonal variation in average numbers of Canada goose, mallard, common goldeneye, and common merganser encountered during project area wildlife censuses.....	15
Figure 5.	Locations of bighorn sheep observations, September 1979- September 1980.....	18
Figure 6.	Dominant vegetation of the downstream Sheppard meadow.....	25
Figure 7.	Dominant vegetation of the middle Sheppard meadow.....	26
Figure 8.	Dominant vegetation of the upper Sheppard meadow.....	28
Figure 9.	Bighorn sheep observation stations.....	35

LIST OF TABLES

Table 1.	Schedule of September 1979 - September 1980 field work, Kootenai Falls Wildlife Study.....	3
Table 2.	Summary of data collected on new species encountered during the first monitoring period (September 1979 - September 1980).....	10
Table 3.	Results of project area wildlife censuses, October 1979 - August 1980.....	12
Table 4.	Harlequin duck observations in the Kootenai Falls area, September 1979 - October 1980.....	16
Table 5.	Summary of Kootenai Falls small mammal trapping program, October 1979 and August 1980.....	22
Table 6.	Number of woody stems less than 3 inches d.b.h. inter- cepted in two transects (74 feet long and an arm's length wide) through each of ten riparian vegetation study plots.....	24
Table 7.	Percent canopy coverage of nine plant communities in three grassy meadows upstream from Kootenai Falls.....	27

INTRODUCTION

Northern Lights, Inc. (NLI), a rural electric cooperative based in Sandpoint, Idaho, submitted an application to the Montana Department of Natural Resources and Conservation (DNRC) in 1980 to build a hydroelectric dam and generating plant, known as the Kootenai River Project, in the Kootenai Falls area of Lincoln County, Montana. In 1978, NLI contracted DNRC to conduct a baseline wildlife investigation in the project area. The results of that study, completed in September 1979, were published later that year (DNRC 1979).

To keep the wildlife data base current and to determine the nature of year-to-year variation in wildlife use of the project area, NLI contracted with DNRC in October 1979 to continue pre-certification wildlife monitoring (see DNRC 1979 for a study plan). This study would provide a data base for documenting project-related impacts and determining the success of mitigation and compensation programs, if the Board of Natural Resources issues a certificate for the site.

This First Annual Report documents results from the first year of the Kootenai Falls wildlife monitoring study (September 2, 1979, through September 1, 1980). The area monitored in this study was the same as that inventoried during the original baseline study (DNRC 1979, pp. 2-3), although some surveys also were conducted along U.S. Highway 2 between Libby and Troy.

METHODS

Field techniques and analytical methods used in this study were as described in the baseline studies report (DNRC 1979, pp. 109-112). Three biologists worked in the study area a number of times during the study period (see table 1). A brief summary of methods employed for individual study segments follows.

Species List Update

The species lists presented in the baseline report (DNRC 1979) were updated, with emphasis placed on refining habitat preference and local distribution data.

Project Area Wildlife Census

This census was designed to collect data that would allow comparison of wildlife use of the project area between months and between years. The methods used were patterned after the standard winter bird study (Kolb 1965) and breeding bird census (Hall 1964, Van Velzen 1972) techniques used in the original inventory, but were extended to include all vertebrate species. The area censused includes: the entire Kootenai River and its shorelines from 50 m (164 ft) below the proposed dam outlet to the upper end of the proposed reservoir; the land which would be inundated by the dam at a forebay elevation of 610m (2,000 ft); the land which would be affected by railroad relocation; and all remaining land between Highway 2 and the Kootenai River. The entire area was censused for three consecutive days during the months of

Table 1. Schedule of September 1979 - September 1980 field work, Kootenai Falls Wildlife Study.

Dates	Observer(s)	Type of Field Work
October 8-11, 1979	PN ^{1/}	Riparian wildlife census, bighorn sheep count, Yaak Falls census, small mammal trapping
January 15-17, 1980	PN,LT	Riparian wildlife census, bald eagle survey, bighorn sheep counts, census of Yaak Falls
April 8-11, 1980	PN	Riparian wildlife census, bighorn sheep tracking, bighorn sheep count, reptile & amphibian search, Yaak Falls census
June 2-4, 1980	PN	Riparian wildlife census, harlequin duck survey, bighorn sheep count, reptile & amphibian search, Yaak Falls census
August 11-14, 1980	PN,LT,JB	Riparian wildlife census, harlequin duck survey, bighorn sheep counts, amphibian & reptile search, small mammal trapping, census of Yaak Falls, habitat description, meadow vegetation analysis.

^{1/}PN=Pat Nichols

LT=Larry Thompson

JB=Jeff Birkby

October 1979, and January, April, June and August 1980, following the instructions outlined in the baseline report (DNRC 1979, Appendix F).

Bald Eagle Survey

The Kootenai River between Libby and Troy was surveyed for bald eagles on January 16 (2 counts) and January 17 (1 count), following the methods of Meyer (1979). Surveys were made from U.S. Highway 2. Bald eagles seen during general surveys and riparian habitat censuses were also recorded.

Harlequin Duck Special Studies

In addition to surveys made during riparian habitat censuses, special searches of the Kootenai Falls area for harlequin ducks were conducted each study day in June and August. In June, emphasis was placed on determining the total harlequin duck population and the number of pairs present in the project area; in August, emphasis was placed on locating broods.

Bighorn Sheep Survey

One day per visit, the cliffs north of the river between Libby and Troy were surveyed with a spotting scope from strategic viewpoints along U.S. Highway 2. All observations were recorded on field maps and data sheets.

On April 10 and 11, ground searches for evidence of sheep use were conducted on the north shore of the Kootenai River adjacent to known bighorn sheep range. These data also were recorded. Differentiating between deer and bighorn sheep sign was difficult.

Amphibian and Reptile Search

At least four hours was spent each month during April, June, and August searching likely habitat in the project area for amphibians and reptiles.

Small Mammal Trapping

Two snap-trap lines (each consisting of 25 stations with two traps per station) were run for three consecutive nights (August 11-14, 1980), one in riparian cottonwoods at the head of Kootenai Falls, and the other in adjacent riparian grassland. Capture data were recorded on standard data sheets.

Census of Yaak Falls

Water and shoreline habitats of Yaak Falls, including those areas within 100 m (328 ft) of the head of the falls (upstream and downstream), were censused for vertebrates on October 10, 1979, and January 17, April 8, June 2, and August 12, 1980, to determine the area's suitability as a future control study or compensation area.

Vegetation Analysis--Riparian Tree/Shrub Habitats

Riparian tree and shrub habitats (including the riparian cottonwood, cottonwood-conifer, and birch-alder communities described by Olsen-Elliott and Associates (1979)) on the south terrace immediately above Kootenai Falls, were sampled August 12-13, 1980, using the methods of James and Shugart (1970). This terrace would be flooded by the proposed reservoir. Ten vegetation plots, each 0.44 ha (0.1 acre) in size, were permanently staked and sampled. Locations of these plots are shown in figure 1.

Vegetation Analysis--Sheppard Meadows

Three grassy meadows on the north bank of the river about 1.5 miles above the head of Kootenai falls (DNRC 1979, p. 62) also were sampled using the canopy-coverage methods of Daubenmire (1959). These meadows are believed to be a source of early-spring forage for bighorn sheep. Because impounding the river could alter the vegetative composition and, thus, the use of these meadows by bighorns, the Montana Department of Fish, Wildlife and Parks (DFWP) has expressed concern over the project.

The property on which the meadows lie, formerly owned by Mr. Dale Sheppard, was purchased by the U.S. Army Corps of Engineers to mitigate the impacts on wildlife habitat caused by Libby Dam. The land is scheduled to be turned over to the State of Montana, and managed by DFWP for bighorn sheep.

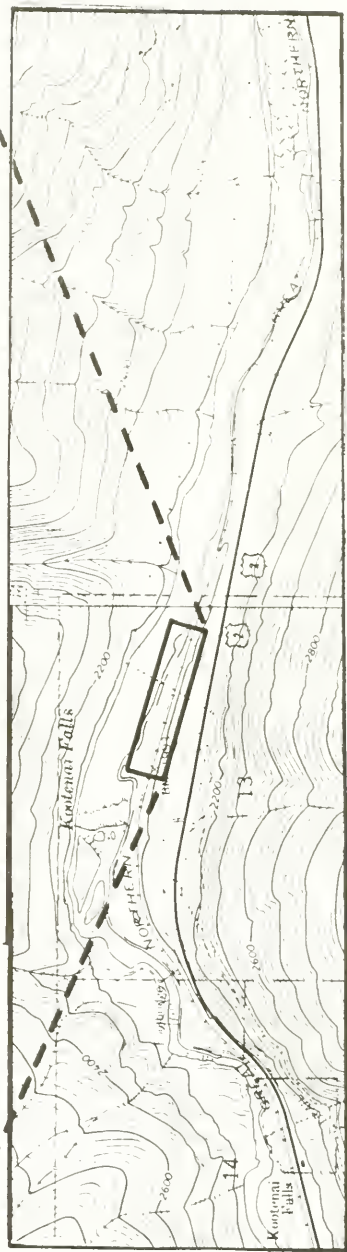
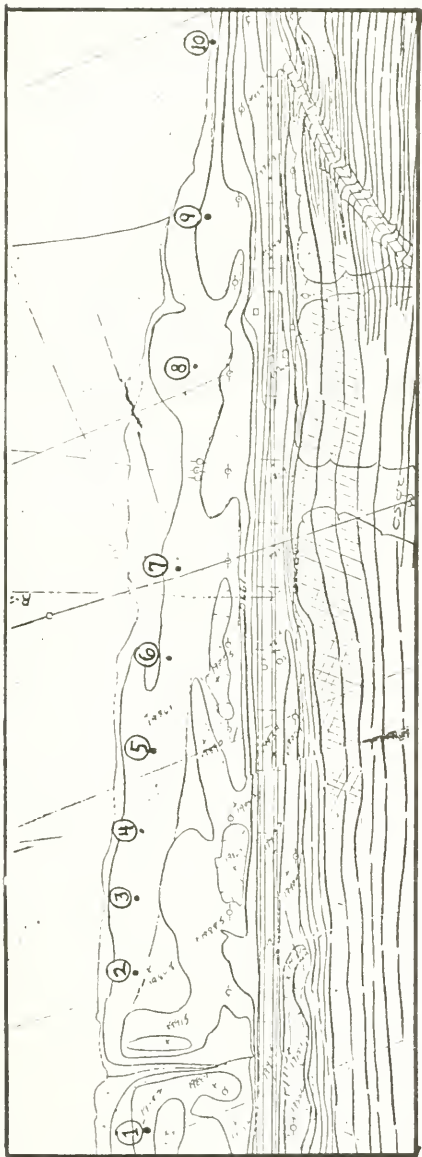


Figure 1. Location of riverine tree and shrub communities.

The following methods were used to determine the distribution of vegetation in the meadows:

- 1) Approximate measurements of the length and width of each meadow were made.
- 2) Major community types in each meadow were determined by subjectively identifying relatively homogeneous stands of associated plant species within a contiguous area.
- 3) Three ten-meter transects were laid out within selected major community types in each meadow. The transects were placed in what appeared to be the most representative part of each community, and were generally oriented parallel to the Kootenai River.
- 4) A measuring tape was stretched the length of the transect, and Daubenmire coverage frames (Daubenmire 1959) were placed on alternating sides of the tape at one-meter intervals. The percent of canopy-coverage for each plant species within each frame was noted and recorded on data sheets.
- 5) Color photographs of the major community types were taken. These are on file with DNRC in Helena.
- 6) Canopy-coverage data, originally assigned a cover class number (Daubenmire 1959), were converted to percent coverage for each plant species, using the midpoint for each class.
- 7) Maps of each meadow were drawn on topographic maps at a scale of 1:1,200.

RESULTS AND DISCUSSION

Species List Update

During the monitoring period, 70 species of vertebrates were observed or trapped--1 species of amphibian, 1 reptile, 55 birds, and 13 mammals. Also during the monitoring period, 13 new species (1 amphibian, 12 birds) were found, bringing the total number of species observed since the studies began in 1978 to 124 (1 amphibian, 1 reptile, 84 birds, and 28 mammals). Data on those new species are summarized in table 2. The types of data included and the abbreviations used are as described in the baseline study (DNRC 1979, pp. 23-29).

Project Area Wildlife Census

Results of the wildlife censuses conducted in the project area during the study period are summarized in table 3.

Seasonal variation in numbers of species encountered during project area censuses each month is shown in figure 2. Study data show that the number of water-related bird species (waterfowl, shorebirds, herons, gulls, ospreys, bald eagles, dippers, belted kingfishers) remains relatively constant year-round, with a slight increase during the breeding season. The number of species of other birds is relatively high throughout the year, but increases considerably during the breeding season.

Census results for the dipper are shown in figure 3, and variations in average monthly abundance of the most common waterfowl species, as determined by the censuses, is portrayed in figure 4.

Species	Habitat ¹	Where Observed ²	Status and Abundance		Months When Seen ⁵											
			This Study ³	Skaar (1980) ⁴	J	F	M	A	M	J	J	A	S	O	N	D
					A	E	A	P	A	U	U	E	C	O	E	
					N	B	R	R	Y	N	L	G	P	T	V	C
AMPHIBIANS																
Coeur d'Alene Salamander (<u>Plethodon vandykei</u>)	RO	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BIRDS																
Gadwall (<u>Anas strepera</u>)	GB,SW		fm-U	b	-	-	-	-	-	-	-	-	-	-	-	-
Green-winged Teal (<u>Anas creca</u>)	GB,SW		sm-U	Bw	-	-	-	A	-	-	-	-	-	-	-	-
Blue-winged Teal (<u>Anas discors</u>)	GB,SW	M,O	s-R	B	-	-	-	-	-	J	-	-	-	-	-	-
Bufflehead (<u>Bucephala albeola</u>)	SW,AV	M	s-R	Bw	-	-	-	-	-	-	-	A	-	-	-	-
Hooded Merganser (<u>Lergus cucullatus</u>)	SW	N,O	w-R	Bw	J	-	-	-	-	-	-	-	-	-	-	-
Common Nighthawk (<u>Chordeiles minor</u>)	FA	L	s-U	B	-	-	-	-	-	J	A	-	-	-	-	-
White-throated Swift (<u>Aeronautes saxatalis</u>)	OA	M	s-R	b	-	-	-	-	-	-	-	A	-	-	-	-
Downy Woodpecker (<u>Dendrocopos pubescens</u>)	RR	21	t-R	bw	-	-	-	-	-	-	-	-	-	-	-	-
Barn Swallow (<u>Hirundo rustica</u>)	OA,PR	21	b-R	B	-	-	-	-	-	J	-	-	-	-	-	-
Mountain Bluebird (<u>Sialia currucoides</u>)	RO,BR	22,J	t-U	B	-	-	-	A	-	J	-	-	-	-	-	-
Northern Shrike (<u>Lanius excubitor</u>)	CC	19	w-R	tW	J	-	-	-	-	-	-	-	-	-	-	-
Western Meadowlark (<u>Sturnella neglecta</u>)	RG	21	t-R	BW	-	-	-	-	-	-	-	-	-	-	-	-

Table 2 continued.

- 1 Habitat categories are listed in approximate decreasing order of preference or intensity of use. Abbreviations as in the baseline report (DNRC 1979), table 1.
- 2 See baseline agent (DNRC 1979), figure 4, for location codes of river stretches (letters) and upland areas (numbers).
- 3 Status: W - Overwinters in area (at least one record each during January and February).
w - Transient in winter.
sm - Spring migrant.
fm - Fall migrant.
B - Breeds on area (nest or dependent young located).
b - Probably breeds in area (territorial males or pairs located).
s - Summers on area in small numbers, but no evidence of breeding.
t - Occurs, but no evidence of breeding.
Abundance: A - Abundant, found in large numbers in appropriate habitats.
C - Common, found in moderate numbers in appropriate habitats; 15 to 50 registrations per year.
U - Uncommon, small numbers in appropriate habitats; 2 to 15 registrations per year.
R - Rare, few sightings; 1 or 2 registrations per year.
- 4 Indicates status of species in latilong No. 1 as reported by Skaar (1980).
- 5 Months when seen are indicated by letter abbreviations in sequence, January through December.

Table 2. Results of project area wildlife censuses, October 1979-August 1983.
Average number per acre present per trip

Species	Oct.	Jan.	Apr.	June	Aug.
BIRDS					
Great Blue Heron	0.2	-	1.1	0.1	0.1
Canada Goose	4.0	1.1	2.7	5.3	0.
Mallard	15.3	0.1	12.1	12.1	14.
Cadwall	0.8	-	-	-	-
Green-winged Teal	-	-	1.1	-	-
Blue-winged Teal	-	-	-	1.7	-
Common Goldeneye	-	0.1	17.3	-	-
Bufflehead	-	-	0.7	-	-
Harlequin Duck	-	-	-	1.0	1.0
Hooded Merganser	-	0.	-	-	-
Common Merganser	5.3	8.0	6.	22.7	12.0
Unidentified Duck	-	-	-	-	0.7
Red-tailed Hawk	-	-	-	-	0.1
Bald Eagle	-	2.0	-	-	-
Osprey	1.8	-	-	1.0	1.1
American Kestrel	-	-	-	1.0	-
Ruffed Grouse	1.3	-	-	-	-
Killdeer	-	1.3	0.7	2.3	-
Spotted Sandpiper	-	-	-	3.0	2.0
Unidentified Gull	-	-	-	0.3	-
Mourning Dove	-	-	-	1.0	1.7
Common Nighthawk	-	-	-	1.0	-
White-throated Swift	-	-	-	-	1.3
Unidentified Hummingbird	-	-	-	0.3	-
Belted Kingfisher	1.3	-	-	-	1.0
Common Flicker	0.3	-	1.0	0.7	-
Pileated Woodpecker	-	0.1	-	-	-
Harry Woodpecker	-	0.3	-	1.0	-
Unidentified Woodpecker	-	-	-	-	0.7
Unidentified Flycatcher	-	-	-	-	1.1
Violet-green Swallow	-	-	-	17.0	-
Barn Swallow	-	-	-	0.7	-
Unidentified Swallow	-	-	2.0	3.0	4.0
Steller's Jay	1.3	-	0.7	-	-
Common Raven	0.6	9.3	1.3	1.0	6.3
Common Crow	9.8	1.3	14.7	10.7	11.0
Chestnut-backed Chickadee	-	0.3	-	-	-
Black-capped Chickadee	3.0	13.1	6.7	5.3	4.3
Red-breasted Nuthatch	2.3	2.3	1.3	1.0	3.3
Gray Catbird	-	-	-	-	1.0
Brown Creeper	-	0.3	-	-	-
Dipper	5.0	7.7	1.3	3.0	1.7
American Robin	0.8	-	13.0	4.7	0.3
Varied Thrush	1.5	-	2.0	-	-
Mountain Bluebird	0.3	-	0.7	0.7	-
Townsend's Solitaire	2.3	0.3	1.0	1.0	-
Golden-crowned Kinglet	5.8	5.3	-	-	-
Cedar Waxwing	-	-	-	-	4.0
Red-eyed Vireo	-	-	-	4.0	0.3
Northern Shrike	-	0.7	-	-	-
Nashville Warbler	-	-	-	0.7	-
Yellow Warbler	-	-	-	1.7	-
Yellow-rumped Warbler	-	-	-	2.0	-
American Redstart	-	-	-	1.3	0.7
Unidentified Warbler	-	-	-	-	0.3
Western Meadowlark	0.3	-	-	-	-
Brown-headed Cowbird	-	-	-	0.7	-
Pine Siskin	-	-	-	-	2.0
Rufous-sided Towhee	-	-	0.7	-	-
Dark-eyed Junco	-	0.3	12.1	2.7	0.7
Chipping Sparrow	0.5	-	-	0.3	1.0
Song Sparrow	1.0	2.0	12.7	8.3	8.0
Unidentified Sparrow	0.5	-	-	-	0.7
Unidentified Passerine	0.7	1.0	-	-	10.1
MAMMALS					
Unidentified Chipmunk	1.1	-	-	1.3	4.1
Tree Squirrel	2.0	2.1	-	-	1.7
Bighorn Sheep	8.8	-	1.0	-	-
White-tailed Deer	0.	-	1.1	-	-
Muskrat	0.7	-	0.3	-	-
REPTILES					
Unidentified garter snake	-	-	-	0.3	-

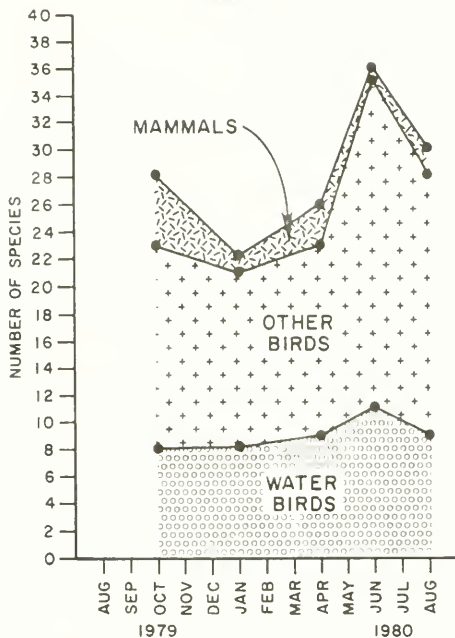


Figure 1. Seasonal variation in average number of dinners encountered during project area wildlife censuses.

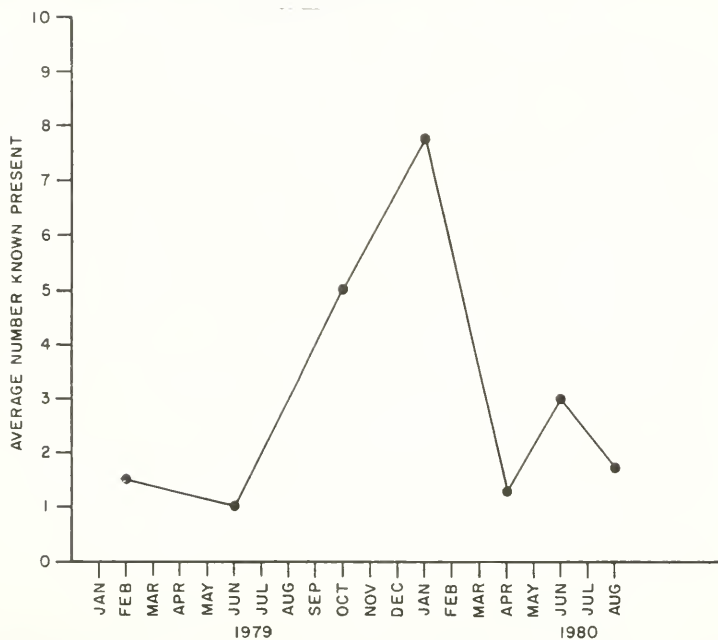


Figure 2. Seasonal variation in average numbers of dinners encountered during project area wildlife censuses.

Bald Eagle Survey

During the monitoring period, bald eagles were observed only in January. No bald eagles were seen during the first two roadside counts, but two adults were viewed during the January 17 count, one near China Rapids and the other near the Libby city limits. At least two eagles, one adult and one juvenile, were known to be present in the project area (near China Rapids) during wildlife censuses. The adult was probably the one observed near China Rapids during the roadside count.

Harlequin Duck Special Studies

Information on harlequin ducks observed during the monitoring period is presented in table 4. On October 8, 1979, a female harlequin was seen in the Kootenai River approximately 3 miles upstream from Kootenai Falls, and on October 12, 1979, an adult female harlequin was shot by a hunter on the Kootenai River near the mouth of Cedar Creek, 7 miles upstream from Kootenai Falls (John Jerešek, pers. comm.). This is an unusually late record for this species in Montana. On June 2, a pair of harlequins was seen feeding and loafing among rocks in China Rapids. Despite an intensive search, no broods were located by DNRC biologists. However, in July 1980, a brood of three young was seen with one adult female and two adult males among the rocks in river section M just above the falls (Rogers 1980; Wolf pers. comm.). This is the first documentation of harlequin ducks breeding in the study area.

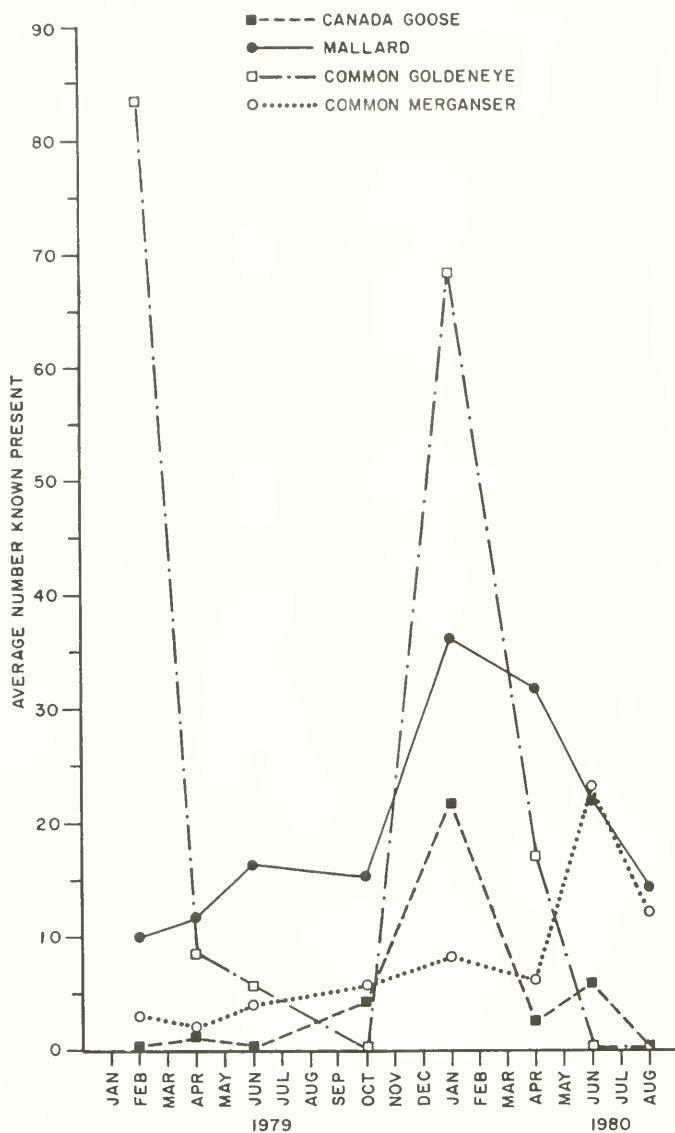


Figure 4. Seasonal variation in average numbers of Canada goose, mallard, common goldeneye, and common merganser encountered during project area wildlife censuses.

Table 4. Harlequin duck observations in the Kootenai Falls area,
September 1979-October 1980.

Date	Minimum number known present				Location (River Section) ^{1/}
	Males	Females	Pairs	Total	
October 8, 1979	-	1	-	1	Q
June 2, 1980	1	1	1	2	P, M
June 3, 1980	1	-	-	1	M
August 11, 1980	-	3	-	3	M
August 12, 1980	-	3	-	3	M

^{1/}Abbreviations as defined in the baseline study (DNRC 1979, pp. 14-16).

Bighorn Sheep Survey

During bighorn sheep roadside counts, 52 sightings of bighorn sheep were recorded (20 ewes, 1 ram, 19 lambs, and 3 unidentified). Locations of these and other bighorn sheep sightings are shown in figure 5.

On October 10, 1979, during the riparian survey, a group of 10 sheep was observed just upstream from the proposed dam's discharge tunnel outlet. This group consisted of 5 rams, 3 ewes, and 2 lambs. Later that day, another group of 12 sheep was observed on the open slopes above Kootenai Falls. This group contained 4 rams, 5 ewes, and 3 lambs.

On April 10, 1980, a group of three sheep was observed during the project area census. This group, bedded on the open bluff across the canyon near the proposed discharge tunnel outlet, was composed of 1 ewe and 2 lambs.

During April 1980, a ground search for evidence of sheep use was conducted on the north shore along the proposed pool. Sheep tracks and droppings were found along the jeep trail and in the apple orchard, but no sheep were seen. A bedding area, with numerous beds, was present in the orchard in the lower Sheppard Meadow. Whether this bedding area was being used by sheep or deer could not be determined.

Figure 5. Location of ashore sheep observations, September 1979-September 1980. (Numbers within symbols indicate group size.)

- ◀◀◀◀ = October 1979
 ◀◀◀◀ = January 1980
 ◀◀◀◀ = April 1980
 ◀◀◀◀ = June 1980
 ◀◀◀◀ = August 1980

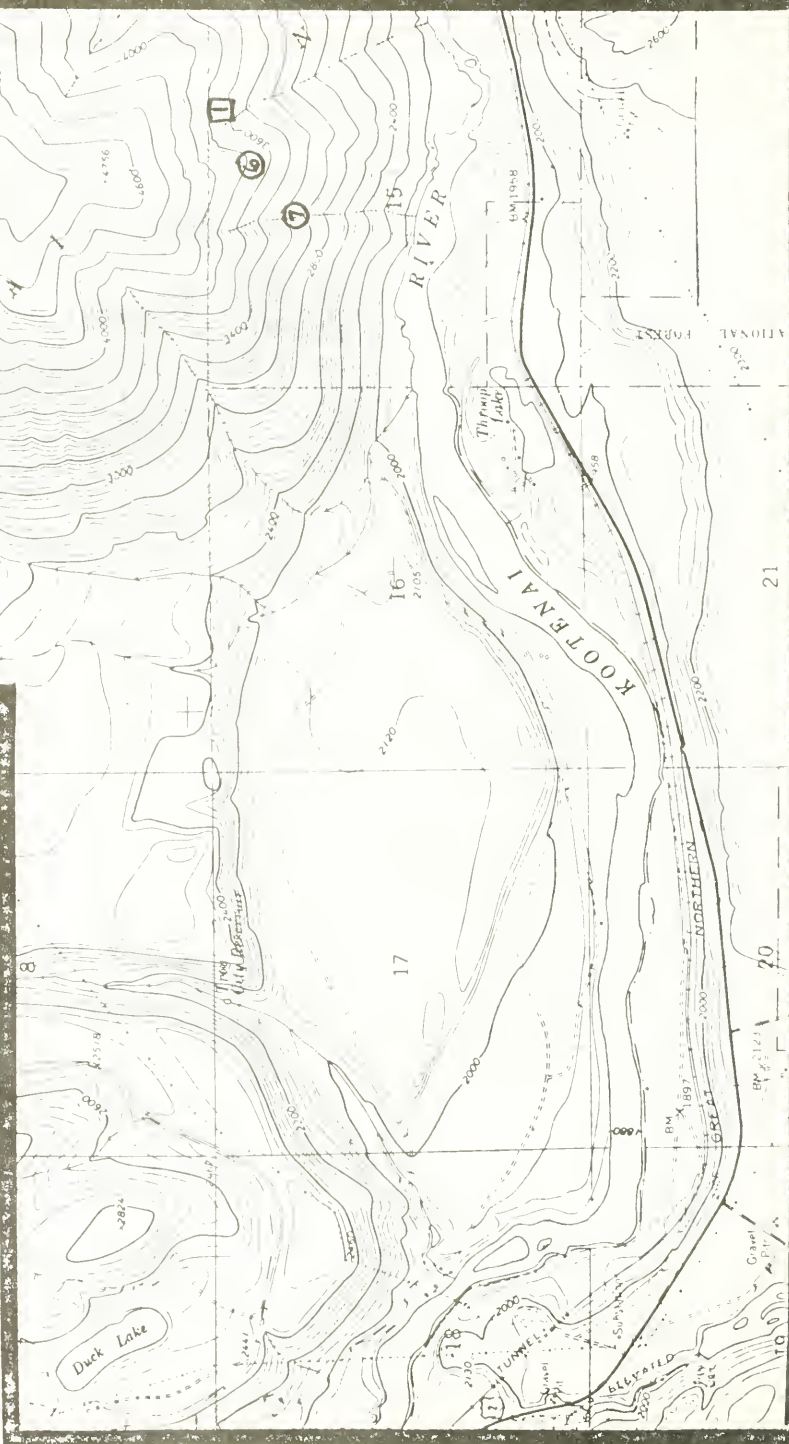
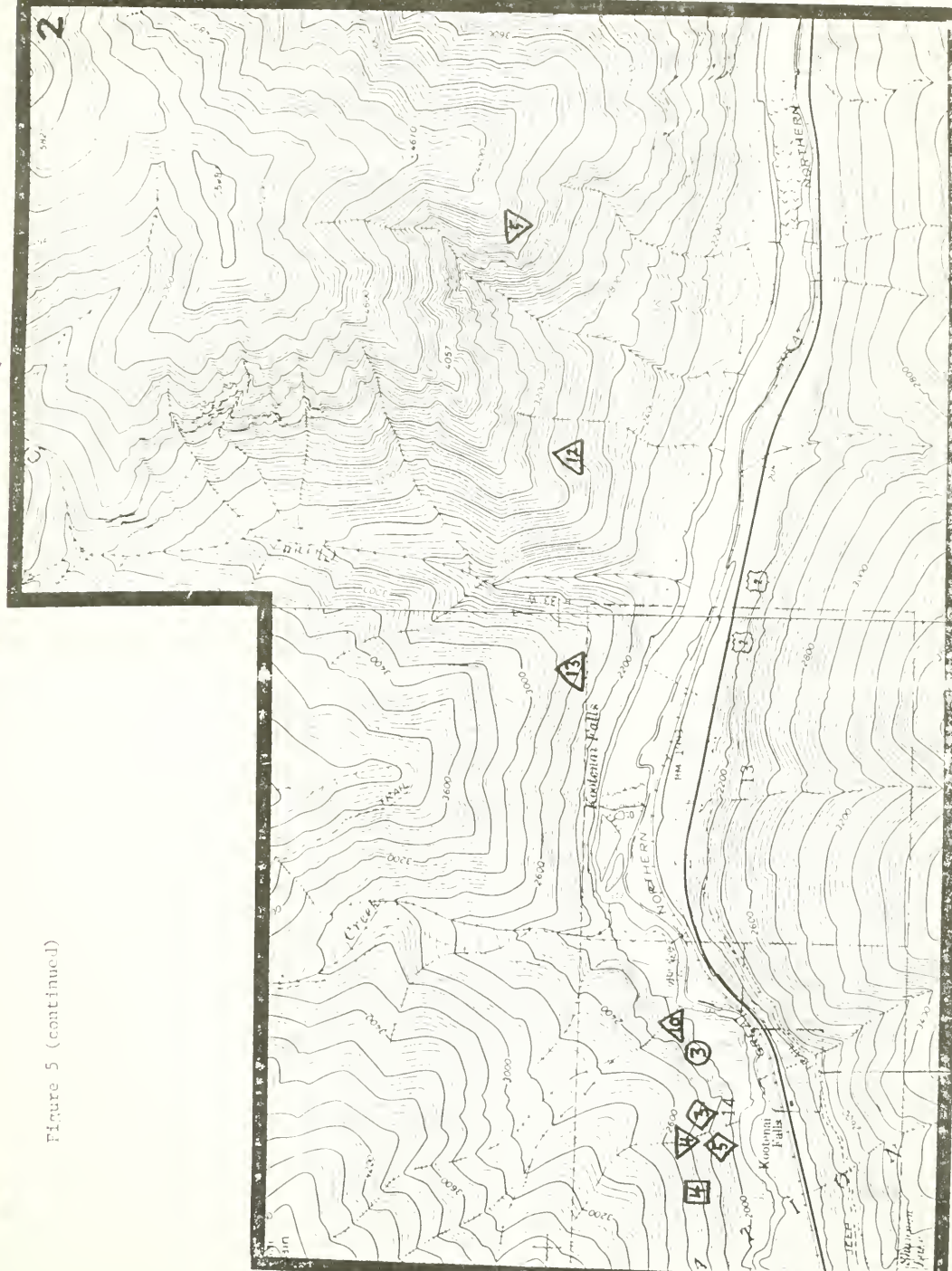


Figure 5 (continued)



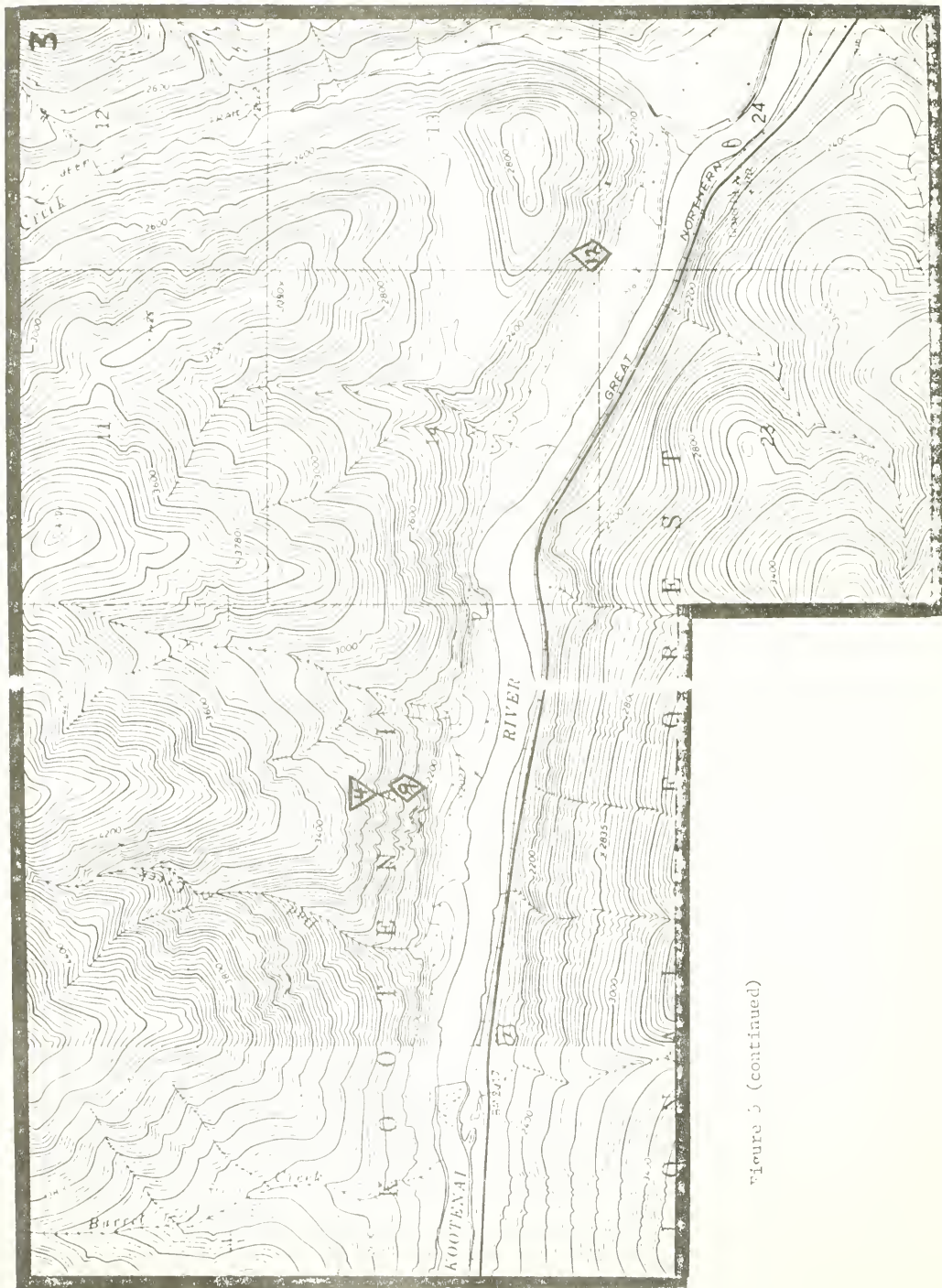


Figure 3 (continued)

Amphibian and Reptile Search

During August 1980, a population of Coeur d'Alene Salamanders (Plethodon vandykei) was discovered under moss on cliffs near the U.S. Highway 2 retaining wall. This area, proposed as the site for an access tunnel to the powerhouse, is one of the very few sites in Montana in which this species (listed as a species of special interest or concern in Montana (Flath 1981)) is known to exist. No other amphibians were observed during the monitoring period.

The only reptile found was an unidentified garter snake (Thamnophis spp.) which was seen during the June wildlife census.

Small Mammal Trapping

Table 5 presents a summary of the results of 1979 and 1980 small mammal trapping.

Census of Yaak Falls

No vertebrates were observed in the Yaak Falls area during the October 1979 and April 1980 censuses. On June 2, 1980, a single dipper and 4 black-capped chickadees were observed at the falls, and on August 12, 2 robins and a raven were observed on the shoreline near the falls. Based on these limited data, it appears that Yaak Falls does not provide a habitat comparable to that of Kootenai Falls, and would not be suitable as a control or compensation area. It is recommended that the census of Yaak Falls be dropped from the monitoring study.

Table 5. Summary of Kootenai Falls small mammal trapping program, October 1979 and August 1980.

	<u>Floodplain Grassland</u>			<u>Riparian Trees and Shrubs</u>			<u>Total</u>		
	1979	1980	1979&1980	1979	1980	1979&1980	1979	1980	1979&1980
Total number of captures	63	28	91	40	21	61	103	49	152
Total number of species	5	4	7	3	4	4	6	5	6
Total biomass (grams)	1265	494	1759	828	415	1243	2093	909	3002
Captures per species									
Masked Shrew (<u>Sorex cinereus</u>)	5	-	5	-	-	-	5	-	5
Vagrant Shrew (<u>Sorex vagrans</u>)	6	1	7	4	2	6	10	3	13
Red-tailed Chipmunk (<u>Eutamias ruficaudus</u>)	-	1	1	3	1	4	3	2	5
Deer Mouse (<u>Peromyscus maniculatus</u>)	26	25	51	33	17	50	59	42	101
Red-backed Vole (<u>Clethrionomys gapperi</u>)	-	-	-	-	1	1	-	1	1
Meadow Vole (<u>Microtus pennsylvanicus</u>)	24	-	24	-	-	-	24	-	24
Long-tailed Vole (<u>Microtus longicaudus</u>)	2	-	2	-	-	-	2	-	2
Meadow Jumping Mouse (<u>Zapus princeps</u>)	-	1	1	-	-	-	-	-	1

Vegetation Analysis--Riparian Tree/Shrub Habitats

Results of the 1980 riparian tree and shrub analysis are presented in table 6 and the appendix. The ten plots studied, representative of the structurally-diverse riparian tree and shrub communities which would be inundated by the proposed Kootenai Falls dam and reservoir, were found to support nine species of trees and 20 species of tall (4.5 feet or taller) shrubs or tree saplings. Overall density of trees was 436 trees per acre, and shrub density was 7,330 shrub stems per acre. Average ground cover was 62.5%, average canopy-coverage was 67.5%, and average canopy height was 46.0 feet. Color photographs taken at each plot are on file at DNRC.

Vegetation Analysis--Sheppard Meadows

Results of the vegetation studies conducted in the grassy Sheppard Meadows are summarized in figures 6-8 and table 7. Descriptions of the three meadows follow.

Downstream Meadow. This meadow (see figure 6) lies on a bench 7,100-8,300 feet upstream from the falls. Meadow elevations range from about 2,000 to 2,008 feet (msl). The meadow is about 230 m long and 40 m wide. Two barns, an apple orchard, and a fallen root cellar and homestead foundation occupy the meadow. A small spring flows into the meadow just west of the root cellar. This meadow is bounded on the north by dense coniferous forests, and on the south by the river bank, which supports a fringe of scattered trees (primarily Pseudotsuga menziesii and Pinus ponderosa).

Table 6. Number of woody stems less than 3 inches d.b.h. intercepted in two transects (74 feet long and 10 arm's length wide) through each of the riparian vegetation study plots.

Species	Plot number										TOTAL
	1	2	3	4	5	6	7	8	9	10	
<u>Acer glabrum</u>	4	2	10	12	11	6	4	-	-	3	57
<u>Alnus incana</u>	-	-	2	-	-	-	1	1	8	-	19
<u>Amelanchier alnifolia</u>	5	10	18	74	35	23	44	63	-	-	277
<u>Betula</u> spp.	32	4	-	1	2	2	-	-	3	-	44
<u>Cornus stolonifera</u>	-	25	4	2	-	4	6	140	129	78	388
<u>Crataegus douglasii</u>	-	2	4	1	2	-	1	1	2	-	13
<u>Eleagnus commutata</u>	-	5	2	-	1	-	4	14	-	-	27
<u>Juniperus scopulorum</u>	-	1	-	-	-	-	-	7	-	-	8
<u>Philadelphus lewisii</u>	12	-	4	53	31	-	-	-	-	45	145
<u>Pinus ponderosa</u>	-	-	-	-	-	-	1	-	-	-	1
<u>Populus trichocarpa</u>	7	1	7	-	-	-	1	1	-	-	17
<u>Prunus</u> spp.	2	14	47	30	21	2	1	9	-	-	126
<u>Pseudotsuga menziesii</u>	-	-	-	-	-	-	-	2	-	-	2
<u>Rosa</u> spp.	2	9	15	11	9	105	46	12	11	18	268
<u>Rubus ideaus</u>	-	-	-	-	-	1	-	-	5	-	6
<u>Salix</u> spp.	-	-	-	-	-	-	1	7	-	2	10
<u>Sambucus cerulea</u>	-	-	-	-	-	-	-	-	3	-	3
<u>Shepherdia canadensis</u>	-	-	-	-	-	-	-	1	-	-	1
<u>Symphoricarpos albus</u>	-	-	5	4	-	4	-	-	38	-	51
<u>Thuja plicata</u>	-	-	-	-	1	-	-	1	-	1	3
TOTALS	84	73	134	188	113	147	110	259	199	159	1466

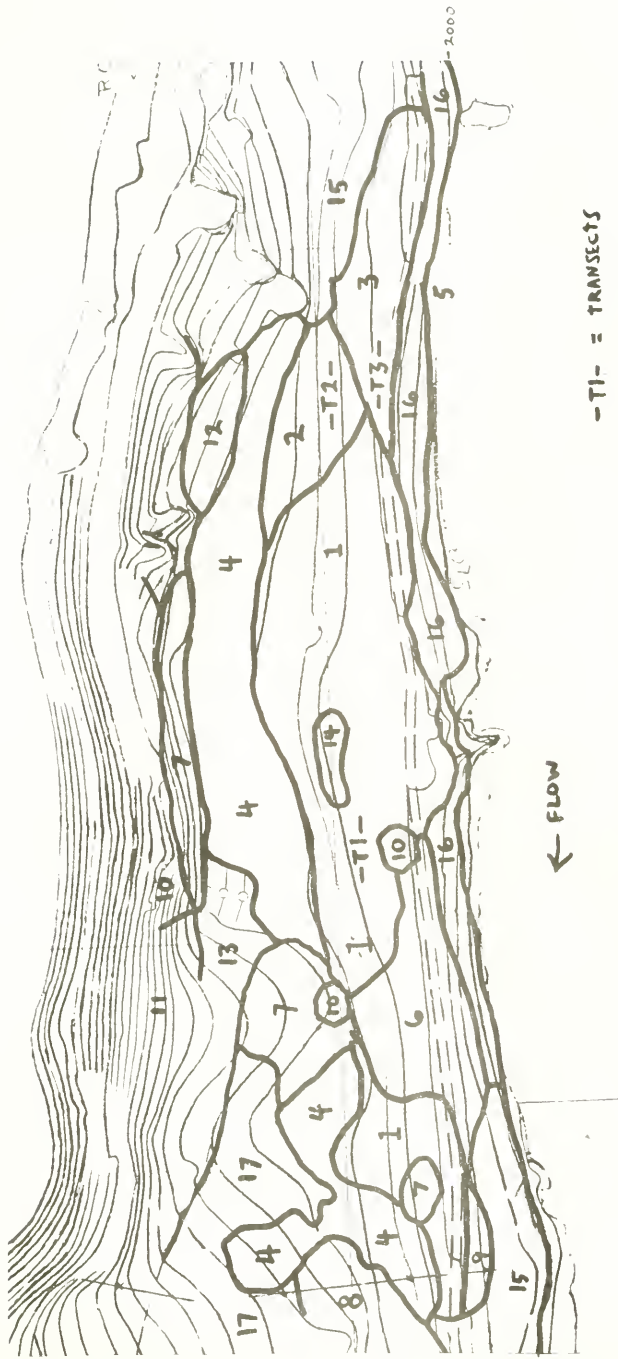


Figure 7. Dominant vegetation of the middle Sheppard meadow. Scale = 1:1270. contour interval = 2 feet

-T1- = TRANSECTS

1. Artemisia repens, Poa pratensis, Plantago lanceolata
2. Plantago lanceolata, Poa pratensis
3. Plantago lanceolata, Poa pratensis, some young
4. Poa pratensis, Artemisia repens, scattered Amelanchier alnifolia, Salix discolor, Amelanchier alnifolia
5. Poa pratensis, Artemisia repens, Plantago lanceolata, Salix discolor, Amelanchier alnifolia
6. Poa pratensis, Artemisia repens, Plantago lanceolata, Salix discolor, Amelanchier alnifolia
7. Artemisia repens, Poa pratensis, Plantago lanceolata, Salix discolor, Amelanchier alnifolia
8. Artemisia repens, Poa pratensis, Plantago lanceolata, Salix discolor, Amelanchier alnifolia
9. Poa pratensis, Medicago lupulina, some young Populus trichocarpa, Amelanchier alnifolia
10. Populus trichocarpa
11. Populus trichocarpa
12. Populus trichocarpa, Amelanchier alnifolia
13. Shrubby Ploverline right-of-way
14. Shrubby Ploverline right-of-way, Amelanchier alnifolia
15. Shrubby Ploverline right-of-way, Amelanchier alnifolia
16. Shrubby Ploverline right-of-way, Amelanchier alnifolia
17. Shrubby Ploverline right-of-way, Amelanchier alnifolia

TABLE 1. Percent canopy cover of riparian plant communities in three grassy meadows upstream from Kootenai Falls.

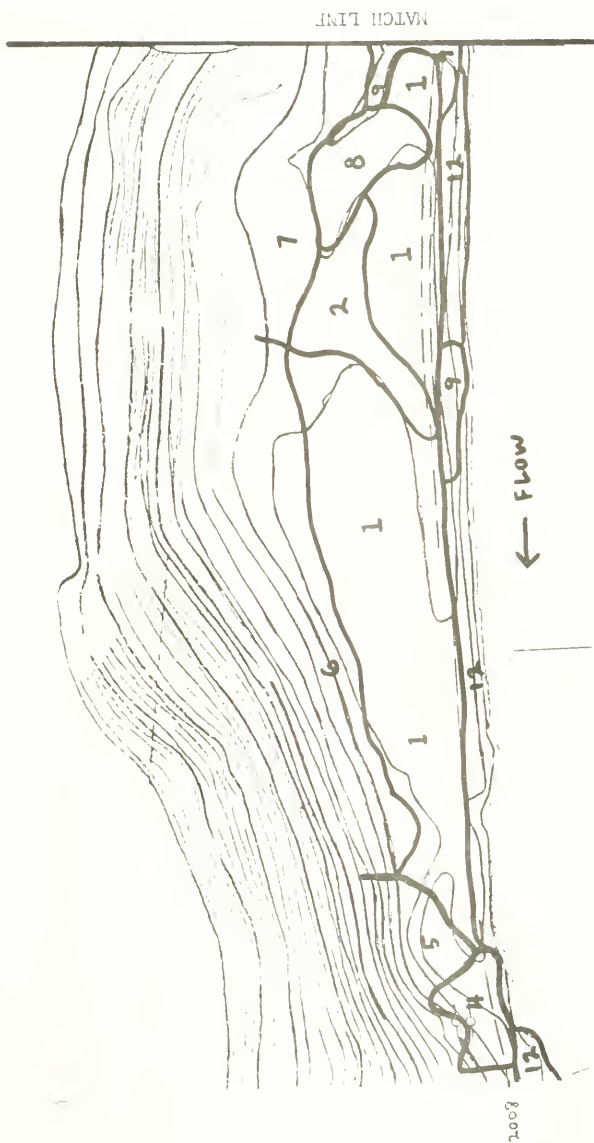


Figure 8. Dominant vegetation of the upper Sheppard meadow. Scale = 1:1200; contour interval = 2 feet

- | | |
|-------------------------------------------------------------------|---------------------------------------------------------------------------|
| 1. <u>Poa pratensis</u> , <u>Phleum pratense</u> | 9. <u>Philadelphus lewisii</u> |
| 2. <u>Carex</u> spp., <u>Minulus guttatus</u> | 10. <u>Populus trichocarpa</u> , <u>Acer glabrum</u> , <u>Betula</u> spp. |
| 3. <u>Poa pratensis</u> with young <u>Populus trichocarpa</u> | 11. <u>Pseudotsuga menziesii</u> , <u>Betula</u> spp. |
| 4. <u>Salix</u> spp., <u>Populus trichocarpa</u> | 12. <u>Populus trichocarpa</u> |
| 5. <u>Betula</u> spp., <u>Crataegus</u> spp., <u>Acer glabrum</u> | 13. <u>Geodv reverchank</u> |
| 6. <u>Betula</u> spp., <u>Alnus</u> spp., <u>Crataegus</u> spp. | 14. <u>Young Populus trichocarpa</u> |

1000'

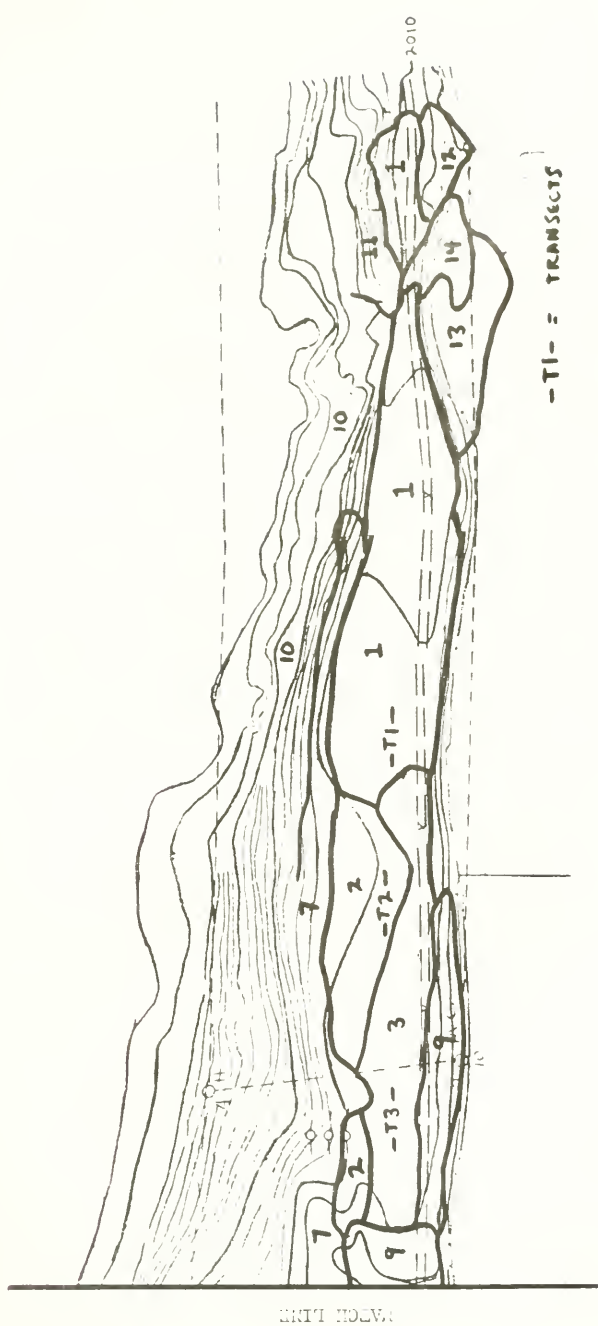


Figure 2 (continued)

The meadow, which was once a hayfield, is dominated by a number of introduced grasses. Most of the meadow is dominated by a mixture of Agropyron repens, Poa pratensis, and Plantago lanceolata. When canopy-coverage was measured in August 1980, Agropyron repens appeared to be the dominant grass in the three transects sampled (table 7). Poa pratensis, Medicago lupiluna, and Taraxacum officinale appeared to have a greater canopy-coverage in early summer than is indicated by this August sampling; this is true in the other meadows as well.

Transect No. 1, located in a representative stand of the predominant community type, contained a large amount of Plantago lanceolata. Transect No. 2 placed on the south side of the road near the edge of the meadow, contained a large number of Achillea millefolium inflorescences and very little Plantago. Transect No. 3 was placed in a community type in which Filago arvensis was abundant.

In the southwestern corner of the meadow, seedlings of Populus trichocarpa, Prunus virginiana, and apple are becoming established among the grasses. Small patches of Bromus tectorum occur on steeper, sandy slopes at the edges of the meadow.

Middle Meadow. This meadow lies 9,500-10,200 feet upstream from the falls. It is approximately 260 m long and 50 m wide (see figure 7). Elevations range from about 2,006 to 2,014 feet (msl). A powerline crosses the meadow's northern edge, and a dirt road crosses near its southern edge. Unlike the other meadows, that portion of the meadow near the riverbank slopes gradually toward the river, rather than dipping sharply to the water's

edge. This gradual sloping may have resulted from frequent inundation and deposition of sandy alluvial soil.

The meadow is bounded on the west and east by forests of Pseudotsuga menziesii and Pinus ponderosa. The northern edge, at the base of a steep, rocky slope, is fringed by Betula and Alnus. Clumps of Betula, Alnus, and isolated Pinus ponderosa occur in the western third of the meadow. A grassy community with clumps of heavily-browsed Amelanchier alnifolia and other shrubs forms a band across the northern third of the meadow. Much of the remainder of the meadow is dominated by Agropyron repens and Poa pratensis. Transect No. 1 was placed in this latter community type (see table 7). Transect No. 2 sampled a community type dominated by Plantago lanceolata and Poa pratensis. Although not included in the transect, clumps of Agrostis alba are present in this community. Transect No. 3 was placed in a community type dominated by Filago arvensis and Bromus tectorum. Over 60% of this community type consists of bare ground, indicative of the poor water-holding capacity of the sandy soil. Young Populus trichocarpa seedlings are invading the meadow near its western and eastern edges. A fringe of scattered Populus trichocarpa and Pinus ponderosa delineates the southern edge of the meadow.

Upstream Meadow. This meadow (see figure 8) lies 11,300-12,800 feet upstream from the falls. It is about 480 m long, and has a maximum width of 30 m. Elevations range from about 2,006 to 2,012 feet (msl). A small stream lined with Populus trichocarpa, Acer glabrum, Betula, and Alnus incana divides the meadow into halves. The northern edge of the meadow, which abuts a steep rock cliff, is lined with Betula, Alnus incana, and Acer glabrum. Tanacetum vulgare, Melilotus alba, and Centaurea maculosa dominate the bank

between the river and the meadow. A fringe of Populus trichocarpa occurs along part of the bank.

Most of the meadow consists of a community type dominated by Poa pratensis; Phleum pratense is a co-dominant in some areas. Transect No. 1 sampled this community type (see table 7). Transect No. 2 was placed near the northern edge of the meadow where three seeps or springs create an area of saturated soil and standing water. The community type here, dominated by Carex rostrata, Mimulus guttata, and Equisetum pratense, contains many wetland plant species. Transect No. 3 was placed among a patch of Populus trichocarpa saplings which are invading the Poa pratensis- and Agrostis alba-dominated grassland just east of the stream.

RECOMMENDATIONS FOR FUTURE MONITORING

The monitoring study described in the baseline report (DNRC 1979) should be continued. However, results of this year's monitoring suggest the following changes in study design:

(1) October Monitoring. Fall conditions do not seem to differ enough from those of August to justify an additional week of study. Therefore, October monitoring should be discontinued.

(2) Yaak Falls. Yaak Falls does not appear suitable as a control area for the project area wildlife census or as a compensation area. Thus, the Yaak Falls census should be discontinued. However, if the dam is to be constructed, a control area for the project area censuses must be selected and added to the monitoring program no later than two years before the dam is constructed. Since an ideal control area does not seem to exist, the stretch of the Kootenai River immediately above the principal study area may be the best location for control studies.

(3) Meadow Vegetation Monitoring. The vegetation of the three grassy meadows described in this report (the "Sheppard Meadows") should be quantitatively studied the year before scheduled inundation and during alternate years thereafter, using the methods employed in this study.

(4) Bighorn Sheep Studies. To more precisely monitor seasonal use of the project area by bighorn sheep, those study methods used during the baseline study and this monitoring study should be combined. Combining these

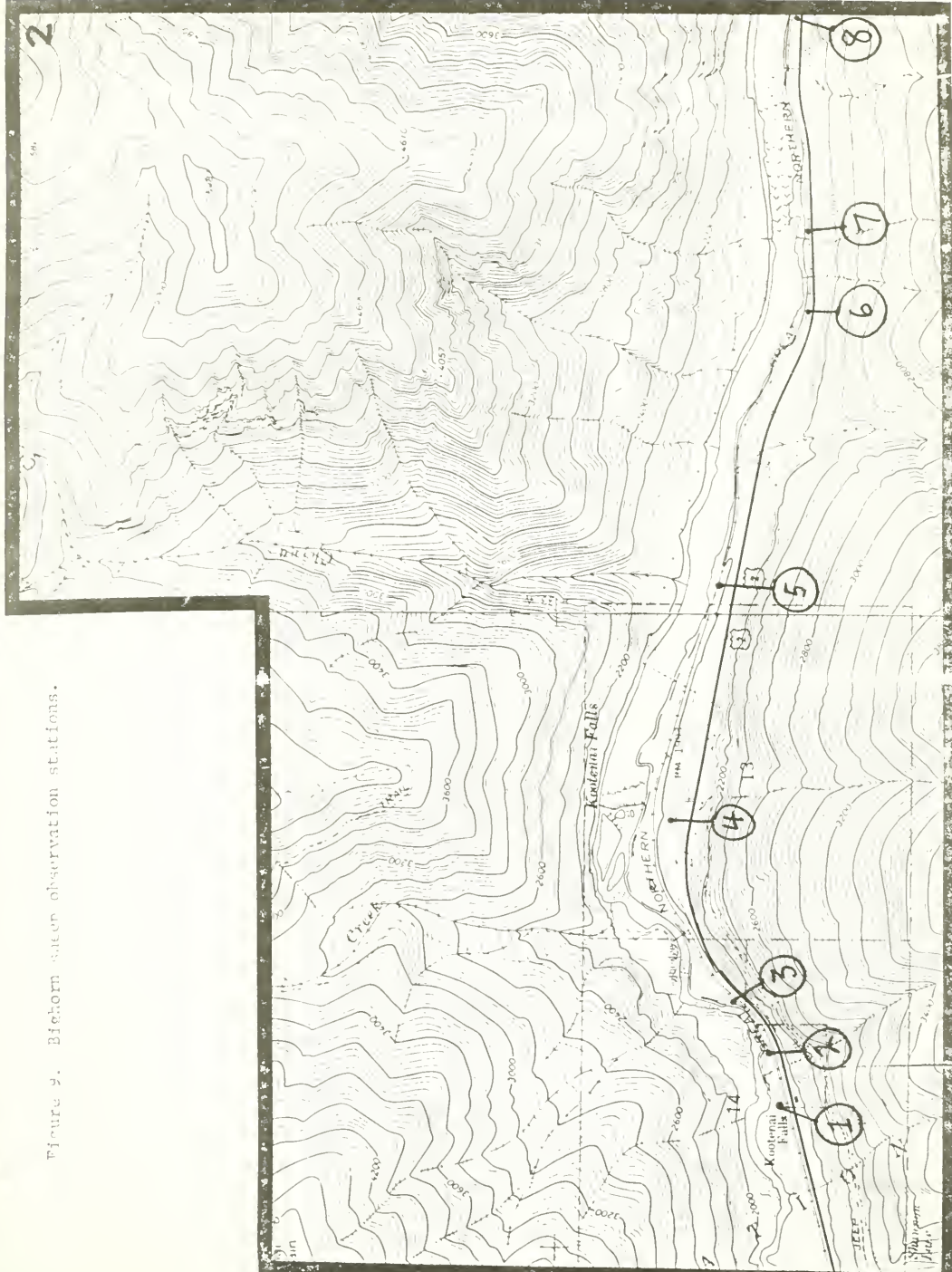
methods will provide an index through which use of project area habitats can be compared between seasons and between years.

The proposed technique for future monitoring is as follows:

The north bank of the Kootenai River--including cliffs, benches, and shoreline--will be searched with a 20X spotting scope from ten fixed observation points along U.S. Highway 2 (see figure 9). Exactly 10 minutes will be spent searching for sheep from each point; all observations from the viewpoint will be recorded on maps and standard data sheets. Sightings made while traveling between viewpoints, and duplicate observations of the same group of animals, will be noted. Weather, snow cover, and visibility conditions also will be recorded; the survey will not be conducted when visibility is impaired by fog or precipitation.

During January, June, and August field trips, researchers should attempt to visit each station three times: once in early morning, once at midday, and once late in the evening. In late March and early April, each station should be visited six times, with observation times rotated so that each station receives some morning, midday, and evening monitoring. In addition, the Sheppard Meadows will be ground-searched for tracks or other evidence of bighorn sheep use during the March-April visit.

Figure 9. Bichom sugar observation stations.



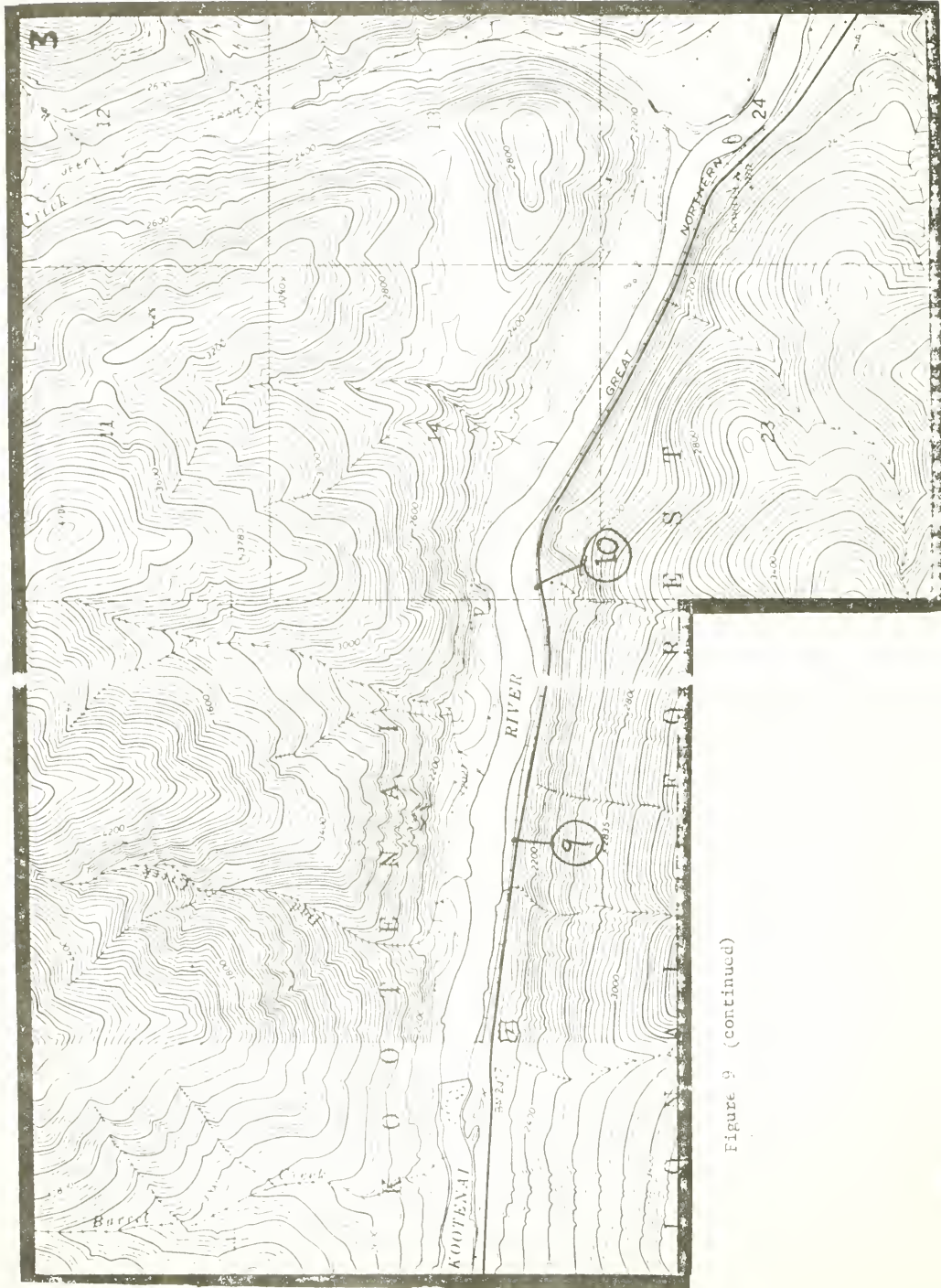


Figure 9 (continued)

ACKNOWLEDGMENTS

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FIELD SHEET FOR VEGETATION DATA

LOCATION: KOOTENAI FALLS

Distance to nearest town having a post office

SIZE

DATE AUGUST 12-13, 1980

LATITUDE - LONGITUDE

DESCRIPTION OF AREA

TOPOGRAPHY

TENTH-ACRE CIRCLES

TREES (10-CMETER SIZE CLASSES A-H, 3-6, 6-9, 9-15, 15-21, 21-27, 27-33, 33-40, >40)

SPECIES	Circle 1	Circle 2	Circle 3	Circle 4	Circle 5	Circle 6
1 Acer glabrum				A(15), B(1)		
2 Betula sp.	A(1)	A(4), B(3), C(4)		A(21), B(8)	A(19), B(20), C(4)	
3 Betula sp.		A(3), C(1)				
4 Calluna vulgaris		A(4), B(1)	A(6), B(2), C(1)	A(6)	A(3)	
5 Pinus ponderosa		E(1), F(1)	H(1)		A(1)	
6 Populus trichocarpa	D(3)					
7 Pinus virginiana		A(1)	A(5)			
8 Thuja plicata	F(1)	B(2), C(1), E(1)	A(2), B(2), D(3), E(1)	E(1), F(1)	D(2), F(1)	
9 Unknown sp.			B(1)			
10						

SHRUBS (NUMBER OF WOODY STEMS LESS THAN 3 INCHES dbh INTERCEPTED IN 2 ARM-LENGTH TRANSECTS)

	51	33	43	30	65	69	63	125	59	54	
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GROUND COVER (20 RANDOM + OR - SIGHTINGS THROUGH OCULAR TUBE FOR PRESENCE OR ABSENCE OF GREEN VEGETATION)

	18+	8+	9+	18+	16+	
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CANOPY COVER (20 + OR - SIGHTINGS THROUGH OCULAR TUBE FOR PRESENCE OR ABSENCE OF GREEN VEGETATION)

	1+	20+	18+	10+	15+	
--	----	-----	-----	-----	-----	--

CANOPY HEIGHT (MAXIMUM CANOPY HEIGHT IN FEET)

	50	50	60	40	50	
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TENTH-ACRE CIRCLES

TREES (10-CMETER SIZE CLASSES A-H, 3-6, 6-9, 9-15, 15-21, 21-27, 27-33, 33-40, >40)

SPECIES	Circle 6	Circle 7	Circle 8	Circle 9	Circle 10	Circle 11
1 Acer glabrum						
2 Pinus ponderosa			A(2)	A(6), B(1)	A(10), B(3)	
3 Pinus sp.				A(2)		
4 Betula sp.	A(32), B(8), C(1)			A(21), B(7)	A(22), B(3)	
5 Betula sp.	A(7)					
6 CRATAEGUS DOUGLASSII	A(1)		A(6), B(1)	A(1)		
7 Pinus ponderosa		F(1)	B(2), D(1)			
8 Populus trichocarpa		B(1)	B(2), C(1)			
9 Pinus virginiana			A(1)			
10 Pseudotsuga menziesii	A(1)	C(1), D(1), E(1)				
11 Thuja plicata				C(1)	C(1)	
12 Thuja sp.				C(1)		
13 Unknown sp.		B(1)	A(1), B(2)		H(2)	

SHRUBS (NUMBER OF WOODY STEMS LESS THAN 3 INCHES dbh INTERCEPTED IN 2 ARM-LENGTH TRANSECTS)

	72	75	76	34	171	88	139	60	80	79	
--	----	----	----	----	-----	----	-----	----	----	----	--

GROUND COVER (20 RANDOM + OR - SIGHTINGS THROUGH OCULAR TUBE FOR PRESENCE OR ABSENCE OF GREEN VEGETATION)

	15+	13+	12+	11+	5+	
--	-----	-----	-----	-----	----	--

CANOPY COVER (20 + OR - SIGHTINGS THROUGH OCULAR TUBE FOR PRESENCE OR ABSENCE OF GREEN VEGETATION)

	15+	10+	3+	13+	14+	
--	-----	-----	----	-----	-----	--

CANOPY HEIGHT (MAXIMUM CANOPY HEIGHT IN FEET)

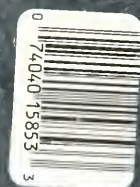
	45	60	35	40	30	
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* Use abbreviated descriptions of trees, shrubs, or herbs to designate species to be identified later. eg. smooth bark, heart-shaped leaf. It is important to identify only the five dominant species.

To check the adequacy of the sample: Total number of trees in 5 circles $\times 2 =$ estimated trees/acreTotal number of trees in 6 circles $\times 1.6 =$ difference

If the difference is less than 25 trees, the sample is adequate. If it is greater than 25 trees, use procedure

SUMMARY SHEET FOR TENTH-ACRE CIRCLES																							
NUMBER OF CIRCLES = 10																							
TREES:		DENSITY ¹								TOTAL		BASAL AREA ⁵								TOTAL BASAL AREA		FREQUENCY ⁸	
SPECIES	NUMBER OF TREES IN ALL CIRCLES BY DIAMETER SIZE CLASS								TOTAL	TREES/ACRE ² (BY SPECIES)	RELATIVE DENSITY ³ (BY SPECIES)	CROSS SECTIONAL AREA OF THE TRUNK AT 4.5 FT FROM THE GROUND (d.b.h.)								TOTAL BASAL AREA (BY SPECIES)	TOTAL BASAL AREA (BY SPECIES)	FREQUENCY ⁸	PERCENT ⁹
	A	B	C	D	E	F	G	H				A	B	C	D	E	F	G	H				
3-A 5-9 9-15 15-21 21-27 27-33 33-40 40										A ⁶ B ⁶ C ⁶ D ⁶ E ⁶ F ⁶ G ⁶ H ⁶										TOTAL			
1 Acer glabrum	25	1							26	26	6.0	2.5	0.3					2.8	1.3	2	4.3		
2 Alnus incana	37	4							41	41	20.9	8.7	1.2					9.9	6.2	3	6.4		
3 Alnus snag	2								2	2	0.5	0.2						0.2	0.1	1	2.1		
4 Betula sp.	146	66	9						221	221	50.7	14.6	19.8	7.2				41.6	26.1	7	14.9		
5 Betula snag	4		1						10	10	2.3	0.9	0.8					1.7	1.1	2	4.3		
6 Choisya bogalis	2	4	1						32	32	7.3	2.7	3.2	0.8				4.7	3.0	7	14.9		
7 Pinus ponderosa	4	2							5	5	1.1	0.1	0.6		1.8	4.9		7.4	4.7	3	6.4		
8 Populus trichocarpa		3	1	3	1	1			10	10	2.3	0.9	0.8	5.4	3.1	4.9		10.1	25.2	15.8	5	10.6	
9 Prunus virginiana	7								7	7	1.6	0.7						0.7	0.4	3	6.4		
10 Pseudotsuga menziesii	1		1	1	1				4	4	0.9	0.1		0.8	1.8	3.1		5.8	3.6	2	4.3		
11 Thuja plicata	2	4	3	5	3	3			20	20	4.8	0.2	1.2	2.4	4.0	9.3	14.7	36.8	23.1	7	14.9		
12 Thuja snag			1						1	1	0.2							0.8	0.5	1	2.1		
13 Unknown snag	1	4							2	7	7	1.6	0.1	1.2				20.2	21.5	13.5	4	8.5	
TOTALS	308	88	17	10	5	5			3	436	436	100	30.8	26.4	13.6	18.0	15.5	24.5	30.3	159.1	100	47	100
TREES/ACRE (BY SIZE CLASS)	30.8	8.8	1.7	1.0	0.5	0.5			0.7	BASAL AREA (BY SIZE CLASS)	30.8	26.4	13.6	18.0	15.5	24.5		30.3					
RELATIVE DENSITY (BY SIZE CLASS)	70.4	20.2	3.9	2.3	1.1	1.1			3	RELATIVE DENSITY (BY SIZE CLASS)	19.4	16.6	8.6	11.3	9.7	15.4		19.0					
⁴ SHADE: Total shrub stem = 0 transects per circle x 100 divided by the number of transects = 7.33 % shrub stems per acre ⁵ CANOPY COVER: Total pulses = 62.5 per circle x 100 divided by the total number of sightings = 62.5 % canopy cover ⁶ CANOPY COVER: Total pulses = 62.5 per circle x 100 divided by the total number of sightings = 62.5 % canopy cover ⁷ CANOPY COVER: Average = 6.0 Range = 3.0 - 10.0																							
NOTES:																							



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